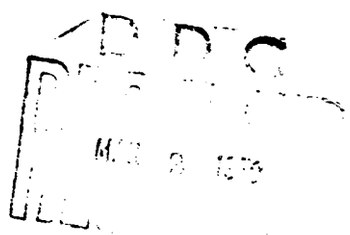
PRR-70-3

NAVAL AIR BASIC TRAINING COMMAND

MANPOWER ALLOCATION AND PRODUCTIVITY MEASUREMENT MODELS

FINAL REPORT

Contract N00022-69-C-0100
Department of the Navy
Bureau of Naval Personnel



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Mellonics Systems Development Division

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FOREWORD

This Final Report for the Naval Air Basic Training Command (CNABATRA) Manpower Allocation Model and Productivity Measurement Model is submitted in performance of Contract No. N00022-69-C-0100. The report describes model formulation, assumptions and the data base used to demonstrate model operations. Outputs for models are separately bound. Operational instructions and computer program documentation are provided in a Users Manual.

SUMMARY

The Manpower Allocation Model (MAM) and Productivity Measurement Model (PMM) for CNABATRA were developed to provide Navy management with tools for improved manpower planning, programming, and budgeting. Development of the models included an investigation of the available data and an analysis of the processes which take place at the various CNABATRA facilities. After the models were then formulated, computer programs were written, tested, and run using available data. The resulting models incorporate the previously developed manpower allocation models for NAS Saufley, Whiting, and Ellyson.[1]

The MAM provides the quantitative means of examining manpower requirements for:

1. NAS Pensacola and associated Training Squadrons VT4, VT6, and VT10.
2. NAS Meridian and associated Training Squadrons VT7 and VT9.
3. Naval Aviation Schools Command (NAVSCOLCOM).
4. CNABATRA Staff
5. CNATRA Staff
6. Naval Aviation Museum

as well as previously developed models for NAS Saufley, NAS Ellyson, and NAS Whiting to support a range of pilot training rates in increments selected by the user. The annual pilot training rates used to run the model were related to CNATRA training loads of from 2000 to 4000 pilots per year in increments of 250. The MAM was developed using the technique of process analysis to examine the work flow of the CNABATRA facilities. Process analysis provides the mathematical structure for the model in terms of labor inputs, intermediate products, and final outputs (trained pilots). This structure, combined with linear programming techniques, is used to determine the optimum (least-cost) manpower requirements for a particular pilot training rate. The effects, in terms of manpower and costs, of policy constraints imposed on the number of use of particular labor skill categories can also be analyzed.

The model incorporates the Resource Management System (RMS) Project PRIME cost and subcost center identification organization. The model is designed to use data from RMS PRIME, OPNAV 5320, Enlisted Distribution and Verification Reports (BUPERS Report 1080-14), and Student Training Progress Critique. Other sources of data can also be used.

For each pilot training rate, the manpower requirements for each subcost center are specified in terms of the billet identification, the labor skill category. The labor skill category is further defined in terms of labor classification: officer, warrant

1. Manpower Allocation Model, Volume 1, Final Report, Contract N00022-69-0076, Mellonics Systems Development Division, Litton Systems, Inc., 16 May 1969.

officer, enlisted men, graded civilians, and ungraded or wage board civilians. The appropriate designator for officers, the rating for enlisted men, and the series for civilian personnel are specified. Where appropriate, based on input data, the NEC/NOBC are identified. The rank, rate, or grade is also listed to indicate the proficiency level of the labor skill.

The model provides the required manhours per month, the equivalent number of people in each labor skill category, and summaries for the cost center. It also determines the required units for each subcost center functioning with the optimum manning.

In addition to this output, other data is available from the linear programming algorithm which can be extremely useful to a manpower requirements analyst. This includes information concerning marginal values, transfer prices, ranges and interrelatiohships of the inputs, intermediate products, and final outputs at optimality. Because of the lack of realistic constraints (upper and lower bounds) and a range of technologies, however, the solutions provided in demonstrating model operation do not reflect the total model capability.

Based on the structure, inputs, and outputs of the CNABATRA activities, the PMM was developed to provide conventional productivity measures, productivity indices, and aggregate productivity indices.

The PMM is intended to provide managers with a means of comparing an activity's performance to particular standards. It may also be used to compare the performance of similar and dissimilar activities.

The PMM uses the monthly RMS PRIME 7000-8 and 7000-9 reports as its source of data. Types of data taken from these reports are the work units accomplished, together with labor hours and dollars expended. The standard productivity index may be specified by the user. The PMM computes a cumulative average of productivity indices for each subcost center that may be used as the standard. Other standards, such as engineered standards may be used. The Manpower Allocation Model (MAM) determines the optimal manning and associated optimal work units for each subcost center necessary to support a particular pilot training rate. This data may be used to form standards for use in the PMM.

Thus, the PMM can be used independently or in conjunction with MAM. Both models utilize the RMS data base structure. By providing the actual ratio of outputs to labor costs and manhours, the PMM can verify the predicted optimal ratio of output to inputs generated by the MAM.

A general framework is also provided for operationally implementing the models in order to satisfy data requirements in the DoD Planning, Programming, and Budgeting System (PPBS).

A users manual containing operational instructions and computer program documentation is available under separate cover.

TABLE OF CONTENTS

	Page
FOREWORD	ii
SUMMARY	iii
SECTION 1 - GENERAL	1-1
Objective of Study	1-2
System Description	1-3
Plan of Study	1-4
General Description of PMM and Its Output	1-6
SECTION 2 - MANPOWER ALLOCATION MODEL DESCRIPTION	2-1
Data Sources	2-2
Command/Accounting Structure Comparison	2-4
Student Flow	2-6
Distribution of Intermediate Products	2-7
Analysis Results	2-8
Identification of Inputs	2-9
Distribution Rules and Products	2-10
Problem Areas and Assumptions	2-12
Structure of MAM	2-14
Applicable Constraints	2-18
Pilot Training Rate Conversion Factors	2-19
Model Output Report	2-20
Additional Model Output	2-23
SECTION 3 - PRODUCTIVITY MEASUREMENT MODEL DESCRIPTION	3-1
Data Sources and Flow	3-2
Limitations and Assumptions	3-4
SECTION 4 - MAM AND PMM APPLICATIONS	4-1
Relationship of Model to Planing, Programming, and Budgeting System (PPBS)	4-2
Continuous Model Applications in the PPBS	4-4
Synthesis of MAM and PMM	4-6
SECTION 5 - MODEL INPUTS	5-1
Labor Input and Process Analysis Structure	5-2
SECTION 6 - PROCESS ANALYSIS	6-1
[illegible]uct Distribution Rules	6-2

SECTION 1

GENERAL

OBJECTIVE OF STUDY

The MAM was developed to provide management with a tool for determining the optimal allocation, computation, and justification of manpower requirements for three naval air stations and their associated squadrons and staff of CNABATRA. The PMM was developed to provide management with an ability to evaluate and compare manpower performance. The Chief of Naval Air Basic Training (CNABATRA) is the primary activity in the Navy pilot training process. The Navy Flight Officer (NFO) program is also conducted under the cognizant of CNABATRA.

The Manpower Allocation Model (MAM) developed under this study is required to determine current and future optimal (least-cost) manpower requirements for the following activities of CNABATRA:

1. NAS Pensacola and associated Training Squadrons VT4, VT6, and VT10.
2. NAS Meridian and associated Training Squadrons VT7 and VT9.
3. Naval Aviation Schools Command (NAVSCOLCOM).
4. CNABATRA Staff
5. CNATRA Staff
6. Naval Aviation Museum

As designed, these models are compatible with others previously developed for NAS Saufley, NAS Ellyson, and NAS Whiting.

The objective of MAM development was to enable management to rapidly predict manpower requirements for CNABATRA to support various training loads. The model was specifically run to determine manpower requirements for four pilot training rates in the range from 2000 to 3000 pilots per year. Other beginning (lowest), ending (highest), and incremental output levels may also be employed. An optimal allocation (least-cost mix) of these requirements by function, category, grade, and required skill level may also be determined. The MAM further was to provide management with the ability to examine the effect of manpower policy constraints on the manpower allocation and associated costs. The Productivity Measurement Model was developed using the same data base as the MAM. The purpose of the model is to form conventional productivity measures, productivity indices. The objective in applying the models is to use the MAM in order to produce optimum manpower and output requirements and to use the PMM in order to verify performance.

SYSTEM DESCRIPTION

The Manpower Allocation Model reflects the interrelationships of primary and support activities within the CNABATRA command structure.

Within the CNABATRA command structure there are five naval air stations and ten associated training squadrons directly involved in the Navy pilot training process. In addition, there are several supporting activities under the cognizance of CNABATRA. The MAM correlates the complex interrelationships of all these activities and enables management to determine CNABATRA's current and future optimal manpower requirements. Figure 1-1 shows the CNABATRA organization structure.

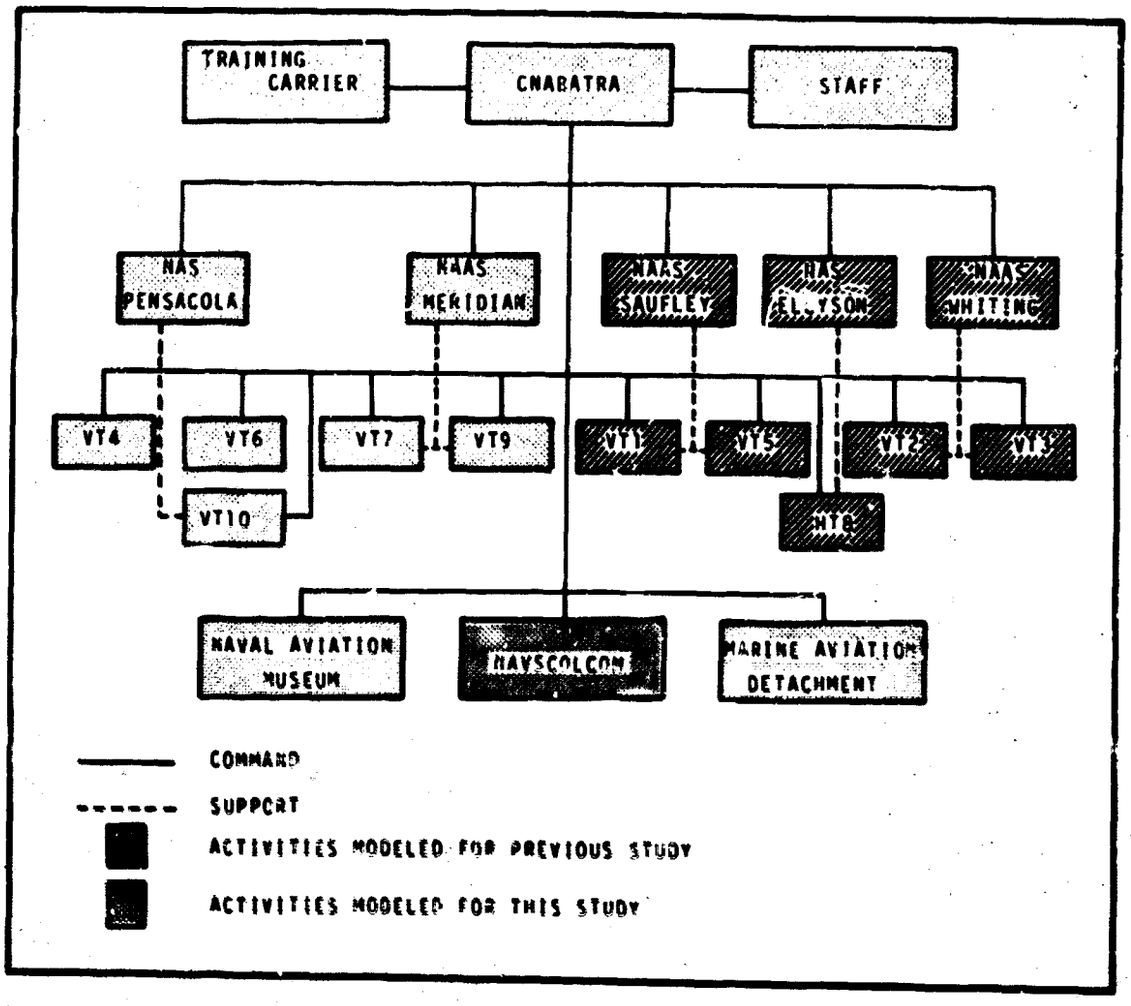


Figure 1-1. Organization of CNABATRA

PLAN OF STUDY FOR MAM

> The approach taken involved an analysis of the pilot training and NFO programs, setting up a production function, and then determining the least-cost mix of labor inputs to produce a specified pilot training output.

Improved source-data collection systems such as RMS PRIME have provided a reliable and comprehensive Navy-wide data base. This permits the application of more objective and quantitative techniques in determining and allocating manpower requirements for functions performed ashore.

As a first step of this study, it was necessary to consider a large number of interconnected intermediate products for each type of activity (RMS PRIME subcost centers) in the two naval air stations and associated squadrons, schools, and staff functions studied. A process analysis technique was employed which deals with the interrelationships of these subcost centers, and the identification of alternative processes for operating and correlating them in the context of the overall program objective.

A basic assumption of this technique is that a linear relationship exists between variable labor inputs (manpower and untrained pilots), intermediate outputs (those products which are consumed internally within the organization), and final outputs (trained pilots). The result of this analysis is the selection of the "best" processes for securing efficient utilization of resources within imposed constraints.

Programs developed under this study described the process analysis for the two naval air stations and provided data in a format suitable for a linear programming solution. The objective function was to minimize the total cost of the labor inputs. Several possible constraints were considered. Not all of these were exercised, however, in generating the manpower requirements presented in this report.

One of the model requirements was the ability to incrementally vary the pilot training rate (PTR) and to incorporate certain constraints on labor (e.g., limits on civilian personnel). Non-negative constraints must be imposed on all variables since negative labor or cost has no economic meaning. Another requirement in developing the model is that the pilot training and NFO training programs be uniquely treated in the model structure to examine impact on manpower requirements from fluctuations in output for either program.

In the overall plan of study for development of the model, process analysis was used to describe the flow of inputs and outputs, as well as the consumption of intermediate products. The RMS PRIME subcost center and cost center structure was the basis for the process analysis. Within this basic structure, the model had to examine all

feasible levels of activity solutions and then arrive at an optimal activity level. The solution then had to be translated into manpower requirements.

In the study plan, the following specific considerations were implemented:

1. Mathematical statements of functional relationships at NAS Pensacola and NAS Meridian between specific manpower inputs, intermediate products, and outputs at the selected levels in the CNATRA pilot training program and in the CNATRA Naval Flight Officer (NFO) program.

2. Mathematical statements of functional relationships of intermediate products consumed by portions of the Pensacola complex, which are sensitive to the CNATRA programs, and those consumed by remaining tenant activities in the Pensacola complex.

3. Aggregation and synthesis of these relationships within the framework of process analysis to a manpower allocation model that specified the optimal mix of manpower over time to achieve specified output levels within stated or explicitly assumed policy and environmental constraints.

4. Constraints on basic manpower resources available to CNABATRA.

5. Aggregation and synthesis of these relationships with CNABATRA activities previously modeled.

GENERAL DESCRIPTION OF THE PRODUCTIVITY MEASUREMENT MODEL AND ITS OUTPUT

> At different levels of command, different types and amounts of information are required. The PMM produces detailed productivity measures at the lower levels where the detailed RMS PRIME data is gathered. It also synthesizes these measures to provide high level commanders with the meaningful overviews.

Regular and timely reports on productivity levels and trends are needed at all levels for effective management, planning, and allocation of the limited resources available. However, the need for, and scarcity of, meaningful productivity measures is especially acute at the high levels of command. The detailed information which is collected by the RMS PRIME system for each cost and subcost center is generally most useful to the lower level commanders. From their detailed knowledge of an individual center's situations, they can almost intuitively judge its productivity. Higher level commanders require that large amounts of detailed information be synthesized to give an overall analysis of the command. Since the timeliness of a report affects its usefulness, the computer program system to implement the PMM is designed to facilitate the application of RMS PRIME data to the model and to speed productivity reporting.

The PMM for CNABATRA forms a variety of productivity measures tailored to the needs of managers at each level of command. From the basic RMS data for individual subcost centers, the PMM forms productivity measures which are then aggregated to successively high levels.

For each subcost center in CNABATRA, the productivity measurement model forms two conventional productivity measures: output per manhour and output per labor dollar (see Figure 1-2). The output per dollar is then divided by the standard for the subcost center to form a productivity index.

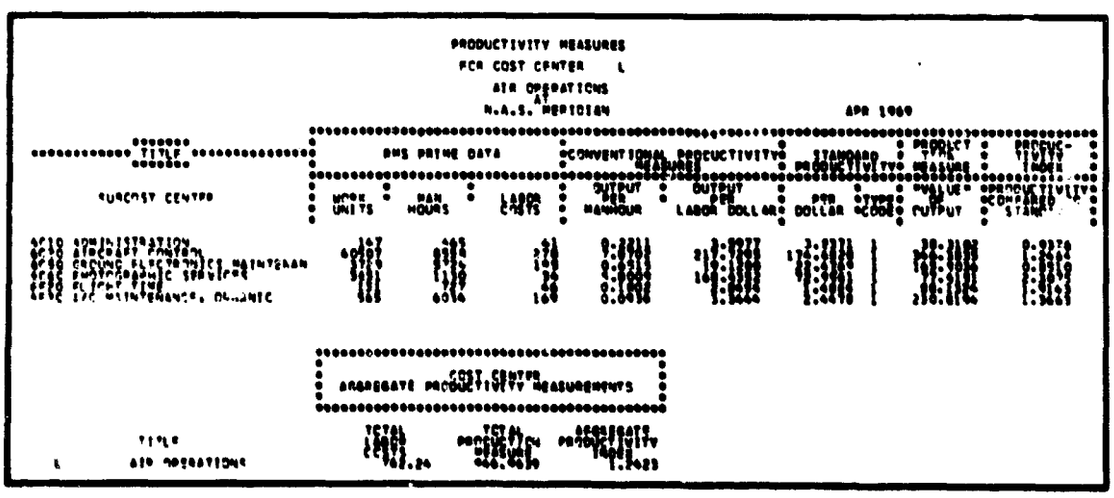


Figure 1-2. Sample Printout of Cost Center Aggregate Productivity Measurements

Since each subcost center's productivity index (PI) is formed by comparing its actual productivity with its own standard, the PI is normalized. They can then be meaningfully compared both horizontally among similar subcost centers at different bases, and vertically among different subcost centers at the same base.

The productivity measures, and the data used to form them, are printed out for each subcost center in a cost center. Then the PMM forms an aggregate productivity index for the cost center. This aggregate productivity index is formed by dividing the total labor cost for the cost center into a measure of the total value of the output of that cost center. This value of output (analogous to a "transfer value" in economist's terminology) is titled Production Measure in the PMM printout. The printed value is derived by multiplying the number of work units produced in each subcost center times the standard cost of these work units (i.e., the inverse of the standard output per labor dollar).

For each command, the PMM reprints the productivity indices of the subordinate cost centers and forms an aggregate productivity index for the command by comparing the sum of the labor costs to the sum of the production measures (see Figure 1-3). Similarly, the PMM forms an overall productivity for CNABATRA (see Figure 1-4) and also reprints the productivities of the subordinate commands.

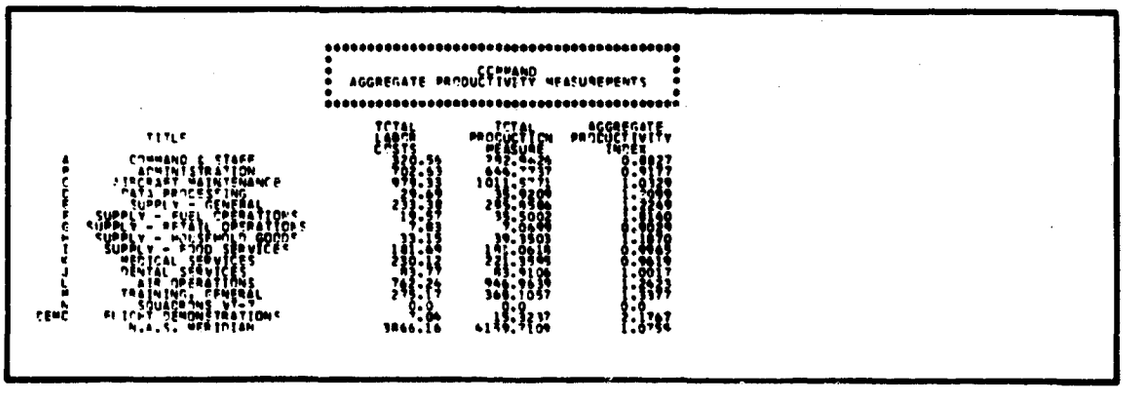


Figure 1-3. Sample Printout of Command Aggregate Productivity Measurements

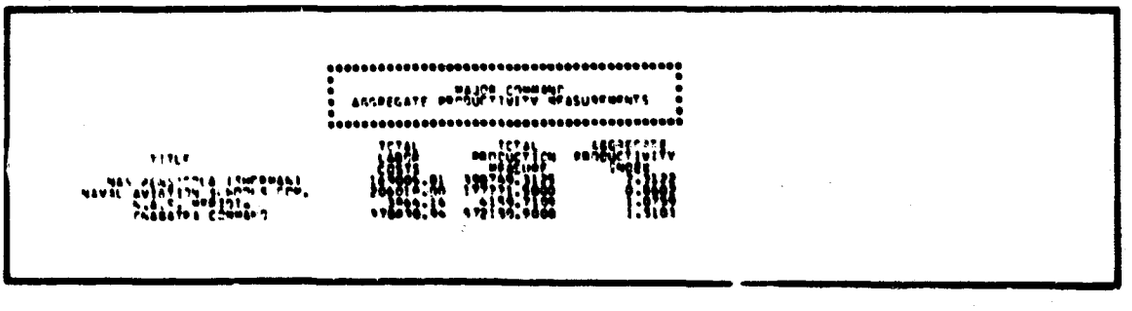


Figure 1-4. Sample Printout of Major Command Aggregate Productivity Measurements

SECTION 2

MANPOWER ALLOCATION MODEL

DESCRIPTION

DATA SOURCES

A variety of sources were explored and utilized in the development and verification of a valid and substantive data base.

The basic sources of data for the development of the Manpower Allocation Model were RMS PRIME 7000-8 and 7000-9, OPNAV 5320 (Manpower Listings) and NAVCOMP MANUAL VOLUME II. In addition, the Logistic Support Requirements Questionaire/Summary (LSR) was used in the development of the NAS Pensacola model structure. The use of the LSR was necessary to isolate those portions of intermediate products of each cost center which are consumed by tenant activities. Some extrapolation from similar CNABATRA organizations was required in the development of the NAS Meridian model structure.

The definition of function and associated work units of all subcost centers at the naval air stations, and at NAVSCOLCOM, were obtained from the NAVCOMP MANUAL VOLUME II. This information was verified, and particulars on the subordination of subcost centers to cost centers were also defined. The subordination pattern for this MAM differs slightly from that of activities previously modeled. This difference reflects organization dissimilarities, changes in CNABATRA reporting procedures instituted in FY 70, and the varying extent of available data. The differences are slight, however, and the structures of CNABATRA activity models are essentially homogeneous.

The RMS work unit for a subcost center is considered the intermediate product associated with that subcost center (i.e., "Number of meals served" is an intermediate product of the General Mess). The process analysis phase of model development included the construction of linear relationships among subcost centers in order to implement the distribution of the intermediate products.

The Weekly Aviation Statistical Report supplemented RMS data with information on the number of squadron flying hours and the number of students on board. Both of these items are used as intermediate products in the process analysis.

OPNAV 5320 provided labor requirements data for the CNATRA and CNABATRA staffs, the two air stations, and NAVSCOLCOM. A further breakdown of labor hours by skill level category was based on this data. The assignments for numbers of personnel (military and civilian) in each subcost center was verified using RMS PRIME data. Detailed listings of labor skill categories are included in Section 5.

Labor for each of the associated training squadrons are grouped into four subcost centers:

1. Command
2. Administration
3. Training
4. Maintenance

Labor requirements were then interpreted directly from billet titles and series codes as given in OPNAV Form 1000/2, which was used in lieu of OPNAV 5320. On-board strength was represented by the authorization for FY 69.

The Weekly Aviation Statistical Report provides data on the production of trained pilots and NFO's. The number of graduations or transfers (final products) was obtained from this report. Details are listed in Section 5.

The use of policy, rather than historical, attrition rates marks an important departure from the data sources employed in the previous models for NAS Saufley, NAS Whiting, and NAS Ellyson. It was found that the historical attrition rate did not offer sufficient flexibility of model usage to answer questions posed by management. The revised procedure allows specification of a variety of paths through the system.

The output rate for VT4, VT6, VT7, and VT9, available for the demonstration of the model, is shown in Figure 2-1.

	Squadron	Monthly	Annual	Model Period* Data
NAS Meridian	VT7	25-150	1050	936
	VT9	30-150	1080	723
NAS Pensacola	VT4	40-130	1020	612
(Sherman)	VT6	40-110	900	618

*Detailed Data Included in Section 5.

Figure 2-1. Final Products Data Used in Model

This output rate was shown to be high in comparison to the output for the model input data which reflected the output for the period January to April 1969.

COMMAND/ACCOUNTING STRUCTURE COMPARISON

The Manpower Allocation Model is based on an accounting structure derived from a definitive base of RMS PRIME data.

The structure included in the RMS PRIME data is the basic accounting structure for determining manpower requirements in support of a given pilot training rate for CNABATRA activities. The RMS PRIME data is organized by cost and subcost center (i.e., personnel at a particular air station are grouped into cost and subcost centers as a function of the products and services of the personnel). Personnel providing a particular product or service related to the pilot training process are assigned the same subcost center. These products and services then become the intermediate products associated with the subcost centers. These subcost centers are then considered as the entities, within an activity, for which manpower requirements must be obtained. This accounting structure is illustrated in Figure 2.2.

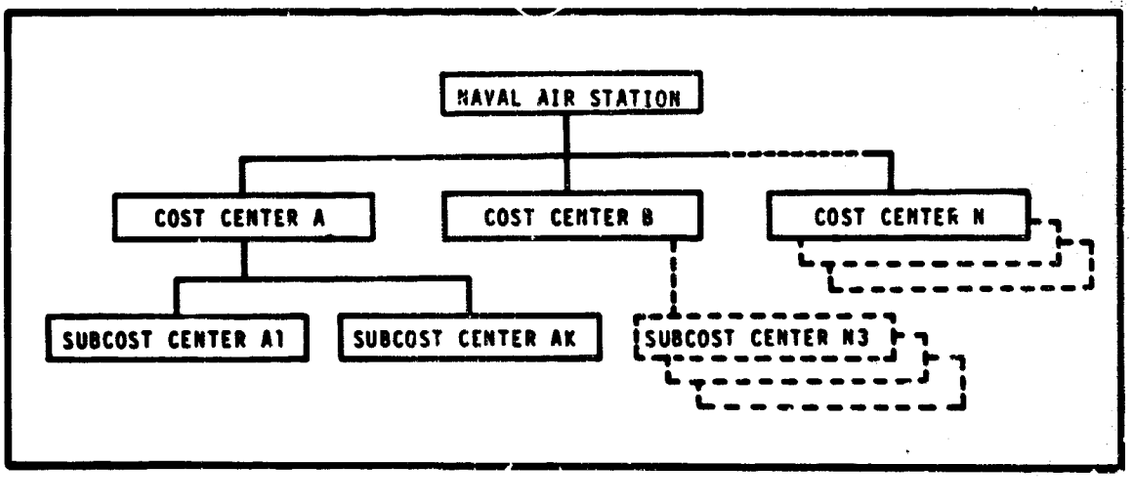


Figure 2-2. - Example of Accounting Structure

The accounting structure in the RMS PRIME data does not consistently parallel the command structure of an air station. The command structure is, of necessity, concerned with a rigid chain of command. A typical command structure is illustrated in Figure 2-3. In the command structure, the air station personnel are assigned to departments where each department has a specific objective, and the orderly flow of goods and services from one department to another is the responsibility of the Command and Executive Offices. As indicated in Figure 2-3, departments may be broken into divisions, which again may be broken into branches, with a chain of command always flowing from top to bottom in the figure. Each department contains, as part of the command structure, a department head or Officer in Command.

In the RMS PRIME data, each department of the command structure is designated as a cost center. However, the subcost center accounting structure does not distinguish, in a "chain of command" sense, between divisions and branches of a department. If a division contains no branches, the division may be designated as a subcost center. If a division is broken into branches, the branches are designated as subcost centers. However, it is possible, in the RMS PRIME data, for more than one branch of a division to be grouped into one subcost center. It is also possible for a branch or a division to be broken up into more than one subcost center.

An accounting structure, as modeled, facilitates a more accurate rendering of work units, specific tasks, and skill level requirements. It permits a cost accountable interrelationship of activities and functions not always apparent or discernable in a command structure. More importantly, it permits the application of objective and quantitative techniques in manpower optimization, yet remains sensitive to policy constraints imposed by manpower planners and managers.

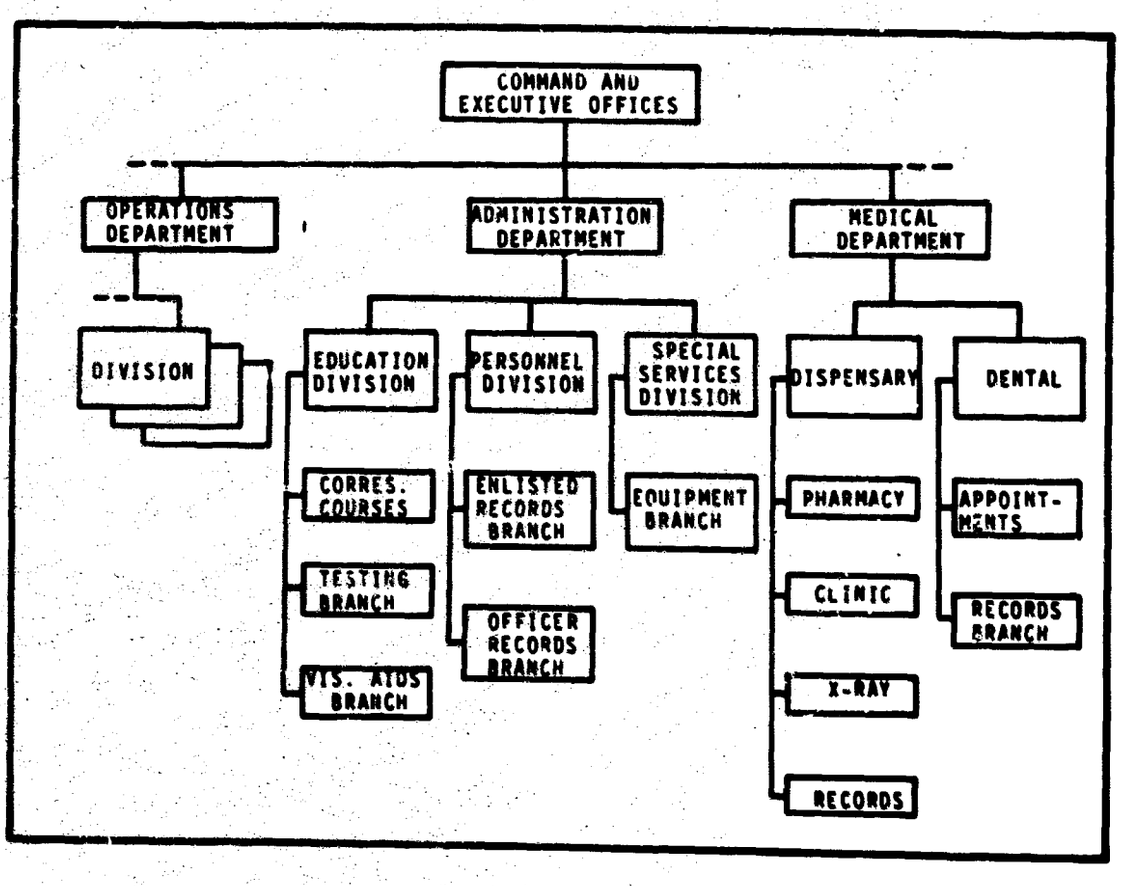


Figure 2-1 Typical Command Structure

STUDENT FLOW

CNABATRA is the primary activity in the navy pilot training process. The Navy Flight Officer (NFO) program is also conducted under the cognizanze of CNABATRA.

The navy pilot training process begins at activities under the command of the Chief of Naval Air Basic Training. Upon graduation from CNABATRA, trained pilots and flight officers are assigned to advanced training or to fleet operations. The MAM makes certain gross assumptions as to student flow which can take up to 30 or 40 different paths through the CNABATRA system. A diagram of the basic student flow, and the relationship of CNABATRA activities in the pilot training, process, is given in Figure 2-4.

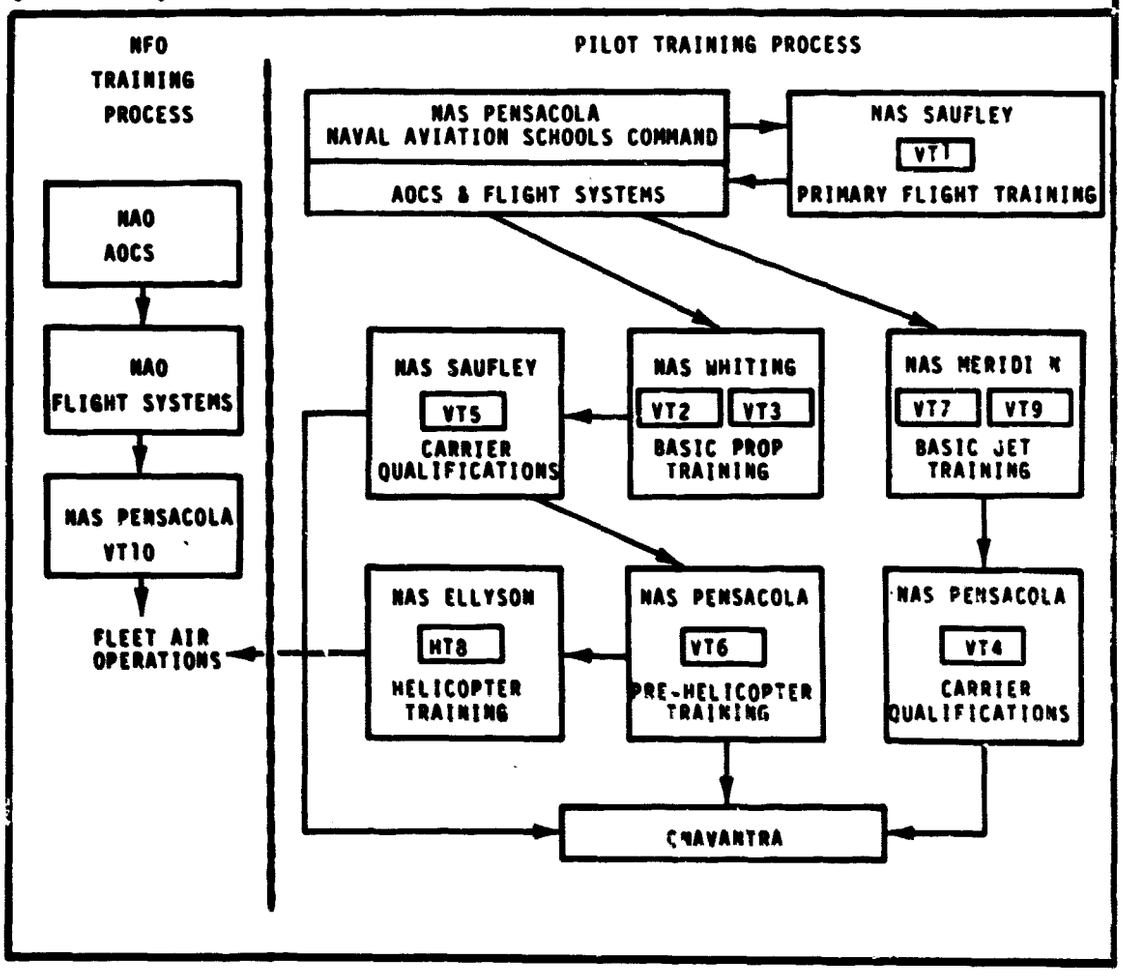


Figure 2-4. CNABATRA Training Process

DISTRIBUTION OF INTERMEDIATE PRODUCTS

> Intermediate products are distributed to various cost centers on a basis of the interrelationships of the cost centers and associated rules of product consumption.

Intermediate products data was obtained from RMS PRIME. This data base contains only information on the production of intermediate products and nothing about consumption patterns of goods and services. The interrelationship between cost centers was subsequently established through detailed investigation, and a process analysis was developed for each work unit. The only cost centers modeled were those for which work units data was available from RMS, and those for which labor assignments could be made on the basis of OPNAV 5320.

The identification and distribution of intermediate products is the key part of the modeling effort. The end result is a representation of the complex interrelations between all the cost centers. For example, the "output" of the General Mess (food service) is the intermediate product "number of meals served", and is distributed to all other cost centers at the station in proportion to the military personnel assigned to these other cost centers. On the other hand, the "output" of the Airframes subcost center in the Aircraft Maintenance Department is the intermediate product "number of airframes work orders completed", and is distributed to Cost Center P (Operations) and the cost center representing the particular training squadrons in proportion to the number of flight hours.

The distribution of every intermediate product was considered for each subcost center. The result of this work is presented in a following section. Each subcost center is identified by name and RMS PRIME code with work units (output) also being given. The nature of the intermediate product was considered in the determination of distribution rules. Those cost centers whose outputs were determined not to vary with pilot training rates were not included in the process analysis. These cost centers are referred to as throughput cost centers.

It is clear that throughput cost centers consume goods and services. It was assumed that a negligible amount of intermediate products were consumed by throughputs and, hence, the percentages used for distribution were computed exclusive of throughput labor. Although this assumption is thought to be valid, the consumption of appreciable amounts of an intermediate product by throughputs can be modeled by the inclusion of a lower bound on the right hand side of the linear programming formulated production and consumption. This is, in effect, a statement that at least some number of products must be produced for the throughput cost centers.

A process analysis approach was used to model alternate modes of production. It simultaneously considers a large number of interconnected partial production functions for each activity of CNABATRA.

Process analysis has the capability of considering alternate modes of production. In a complex organization such as CNABATRA, this approach considers a large number of interconnected partial production functions to determine a least-cost labor mix. Certain specific tasks are inherent in the development of a process analysis model:

1) Development of an exhaustive list of processes employed.

2) Identification of inputs and outputs for each process.

3) Determination of relationships (linear) between inputs and outputs.

The results of such analysis are discussed in the following sections. This process analysis provides a comprehensive look at the structure of each of the CNABATRA activities modeled.

The form and operation of the models are identical. The principal difference arises in the need to specify precisely the different "processes" and their unique interrelationships at each of the activities modeled. This is the essence of the process analysis approach. That is, the methodology is general, but the specification and interrelationship of inputs, intermediate products, and final outputs for each facility is unique to that facility.

Details of the analysis are to be found in Section 6, Process Analysis where results are presented for each of the models developed.

IDENTIFICATION OF INPUTS

Inputs to each activity of CNABATRA are of two general types: student input and labor input.

Student pilot inputs are costed in the model objective function as paygrade 01 (Ensigns). The required quantities of student pilot inputs are based on the overall training requirements and a student pilot attrition rate.

The categories of labor inputs at the CNABATRA activities include, for example: Officers and warrant officers, graded and ungraded civilians, and rated and non-rated enlisted men. These labor inputs were costed in accordance with DoD Instruction 7220.25, "Standard Rates for Costing Military Personnel Services", 1 August 1968, and DoD Instruction 7041.3, 26 February 1969. They were then distributed to the various cost centers at the various activities, in fixed proportions based on the manpower listings provided. Since these listings were for one point in time only, the interchangability of various labor categories over time was not made explicit for this particular application of the model. Thus, it was not possible to modify the fixed proportions of labor inputs specified for any given cost center.

Labor inputs are further classified as variable labor inputs, or as "throughputs"; that is, labor assigned to cost centers included in the process analysis or to throughput cost centers. A "throughput" by definition is a cost center whose manning requirement remains at a constant level for the training rates under consideration.

The MAM is designed only to address the problem of optimizing the required variable labor inputs. For purposes of providing a complete manning document for each activity, however, throughputs are printed out along with the optimized variable labor inputs.

Specific identification of the general inputs is contained in the models and in Section 5, Model Inputs.

DISTRIBUTION RULES AND PRODUCTS

Tenant activities and throughputs were identified and incorporated into the CNABATRA models with special relationships and constraints. The nature of the intermediate product was considered in the determination of distribution rules.

Tenant activities are defined as activities receiving support from a naval air station, and throughputs are defined as activities of an air station that do not contribute to the pilot training process. However, both consume intermediate products of cost centers that are related to the pilot training process. Manpower requirements for tenant activities and throughputs, and their consumption of intermediate products, are independent of the pilot training rate, however. The significant difference between tenant activities and throughputs is that throughputs are air station activities that are ordinarily part of the air station structure, while tenant activities are not. An example of a tenant activity is the Naval Weather Facility located at NAS Pensacola, and an example of a throughput activity is Cost Center N (Security). A complete list identifying the tenant activities and throughputs for the activities of CNABATRA was provided by CNABATRA and is shown in Figure 5-1 in Section 5.

Once the tenant activities and throughputs were identified, they were not included in the model as individual activities. However, their consumption of intermediate products was included in the model as explained below.

The linear program formulation of the Manpower Allocation Model is briefly described in Section 1 of this report. This includes linear relationships and constraints which represent the distribution and consumption of intermediate products among the various cost centers. It is through the use of these constraints that the influence of the tenant activities and throughputs is included in the model.

When the number and type of personnel at the tenant activities and throughputs were determined, the distribution functions for the consumption of intermediate products, shown in Figure 5-2 in Section 5, were used in order to determine the consumption of intermediate products for each activity. Assuming that these activities did not contribute to, or influence, the pilot training rate, the amount of intermediate products consumed for these activities was then entered into the model as a lower bound for the output and the consumption of the intermediate products for the appropriate cost centers. In this way, each cost center included in the model is required to produce an initial amount of output which is equivalent to the total amount of the output consumed by all of the tenant activities and throughputs. It is at the same time required to produce a minimum amount of output which is the total amount of output consumed by all of the tenant activities and throughputs plus the total amount of output consumed by all other cost centers.

For example, consider in particular the mess hall facilities at NAS Pensacola, Subcost Center 9911. The work unit, or intermediate product, for this subcost center is the number of meals served. If it can be determined (for the time period under consideration in the model) that the tenant activities and throughputs consume, say, 4,000 meals, then the output of Subcost Center 9911 must be greater than, or equal to, the number of meals required by all cost centers included in the model, plus the 4,000 meals consumed by the tenant activities and throughputs.

PROBLEM AREAS AND ASSUMPTIONS

The problems encountered in the development of CNABATRA models were related to synthesizing structure with CNABATRA activities previously modeled, quantifying the interrelationships at NAS Pensacola, representing a reorganization in the pilot training program, and data availability.

The following paragraphs identify problems encountered in modeling NAS Pensacola and NAS Meridian.

Synthesis of the accounting structures between newly modeled activities (NAS Pensacola and NAS Meridian) and the activities previously modeled was technically difficult although conceptually the five air stations are relatively homogeneous. The original computer programs utilized the cost center and subcost center designations for classification purposes. Program modifications were necessary to accomplish the same classification functions in the new model. For example, the Chaplains office as NAS Saufley is subcost center 1A50 under cost center 1A; however, the Chaplain's office at NAS Meridian is subcost center 9931 under cost center A. The modifications can now handle both cases.

Another problem area (discussed in detail elsewhere) was encountered in defining the interrelationships between activites at NAS Pensacola. The support of the CNABATRA training squadrons and the NAVSCOLCOM is only a fraction of the production of many NAS Pensacola cost centers. The definition of the support relationships and the quantification of the support populations was based on the Logistic Support Requirements (LSR) Summary provided to the model development study. This study proved invaluable and future modifications of the NAS Pensacola model should be reviewed against updated LSR to redefine support approximations. Where the LSR lacked detail, such as in supply, assumptions were made based on conversations with CNABATRA staff personnel.

Another problem area was the reorganization of the CNATRA pilot program occurring within the model data period. All model data is adjusted to reflect a constant training load even though the sequence of syllabus was changed. Officer candidates undergoing training under the new syllabus are added to those under the old syllabus and one on-board strength is used for the Aviation Officer Candidate School. The same is true for Flight Systems School.

It is also assumed that VT7 and VT9 were operated in parallel syllabi for the model period. In the general problem area of data availability, numerous minor adjustments and allocations were necessary to prepare the data for demonstration of the model.

Assumptions had to be made for mission data. Fortunately, the data not available to the study was only in the area of throughput activities and detailed labor listings are not included. Totals by officer, enlisted and civilian for CNATRA Staff and the Marine Aviation Detachment were taken from the LSR. The Commander of each was included in the Labor inputs to demonstrate model output. When the data becomes available, it can easily be added to the labor input without changes.

In the supply cost centers of NAS Pensacola, the NAVCOMP manual was followed in designation of subcost centers as being throughput or non-throughput. The Labor Skill Categories and organization titles listed on the OPNAV 5320 forms were difficult to correlate to the RMS work unit data. Correlation was based on the supply structure of NAS Whiting and upon conversations with CNABATRA staff personnel. The allocations, combined with the production for non-throughput, represent the best approximation of the impact on supply caused by pilot training.

In other NAS Pensacola cost centers, such as Cost Center Q and Cost Center D, a large measure of production is for tenant and throughput activity. Production of training officers includes driver training, and the Photo Lab supports other activities with non-aerial photography. This support was indicated in the LSR but the extent was not. The assumption was made that the majority of production was for non-throughput activities and a lower bound was not set. When this ratio is determined, the bound can be easily entered as explained in the Users Manual.

The labor input data available to the study consisted of one technology as was true for CNABATRA activities previously modelled. To overcome this data problem, the first labor technology was duplicated to serve also as the second technology for purposes of demonstrating the NAS Sherman and Meridian models. As explained in the User's Manuals, at least two different technologies must be used to exercise the model for addressing management questions. Also, upper and lower bounds on labor input (by specific skill level/category) would represent types of policy constraints that are likely to be imposed by the Navy/DoD, and the models have, therefore, been formulated to accept and treat them. However, the sample model output contains an unbounded solution because of the lack of different technologies to trade off in minimizing the objective function, and realistic policy constraints on labor inputs.

MAM is structured to minimize total manpower cost to attain a specified output level. An understanding of the mathematical and logical structure of the MAM will assist the user in operating and modifying the model.

The MAM is structured so that by varying the level of desired output, trained pilots and stating pertinent constraints, it is possible to compute the least cost mix of manpower inputs required.

Before further describing the mathematical form of the model, certain notations are defined:

- x_i - ith labor input classified by skill category and level in units of manpower per month
- z_i - ith final output item classified by level of pilot training achieved in units of number of pilots per month
- Y_i - ith intermediate product classified by the producing cost center and the consuming cost center in work units per month
- c_i - cost of the ith labor input (x_i) in dollars per manhour
- W - a column vector of activity levels; each cost center is run at some activity level in each technology period
- X - column vector of labor inputs; i.e., $\begin{bmatrix} x_1 \\ \vdots \\ x_n \end{bmatrix}$

  Capital letters are used to represent vectors of quantities (for example, the x_i's and z_i's)
- A - technological matrix whose entries (technological coefficients) are related to partial productivities and reflect the operation doctrine/ organization of a cost center.

Process analysis is used to describe the flow of inputs and outputs to and from the various cost centers. The rules by which these products have been distributed for NAS Saufley, Pensacola, Meridian, Ellyson and Whiting are described in the discussion of process analysis. With the structure provided by process analysis, the manpower allocation model is designed to minimize the total cost of the variable labor input: ($\Sigma c_i x_i$) subject to certain constraints. These constraints are as follows:

1. Outputs ≥ specified level
2. Policy constraints on labor utilization
3. Upper and lower bounds on variable labor inputs
4. Non-negativity constraints on variables

In more mathematical terms, the model becomes:

Minimize: $$C^T X \tag{1}$$

Subject to: $$Z \geq K_1, \tag{2}$$

$$AW = \begin{bmatrix} Z \\ Y \\ X \end{bmatrix} \tag{3}$$

$$K_2 \leq X \leq K_3 \tag{4}$$

and $$W, X, Y, Z \geq 0 \tag{5}$$

where:

C and X are column vectors (C^T is the transpose of C)
A is an N x m technological matrix
K_1 is a column vector of required outputs
K_2 and K_3 are lower and upper limits on labor inputs
W is an m x 1 column vector of activity levels of subcost centers
Z is a column vector of n_z outputs
Y is a column vector representing n_y intermediate products
X is a column vector of n_x variable labor inputs

Note that $N = n_z + n_y + n_z$. Here, m is the number of distinct technologies or means of operating and organizing subcost centers.

The model formulation by equations (1) through (5) contain both X and W as unknowns.

The model solution is obtained by a linear program and is expressed in terms of activity levels of the various cost centers as follows:

$$AW = \begin{bmatrix} A^{(1)} \\ A^{(2)} \\ A^{(3)} \end{bmatrix} \qquad W = \begin{bmatrix} Z \\ Y \\ X \end{bmatrix} \tag{6}$$

where $A^{(1)}W = Z$, $A^{(2)}W = Y$, and $A^{(3)}W = X$. The linear program problem becomes: Find values for the elements of W which minimize

$$C^T A^{(3)} W \tag{7}$$

subject to the following constraints:

$$A^{(1)}W \geq K_1 \tag{8}$$

$$A^{(2)}W \geq 0, \tag{9}$$

$$K_2 \leq A^{(3)}W \leq K_3, \tag{10}$$

and

$$W \geq 0. \tag{11}$$

Equations (7) through (11) express the linear programming problem for the vector W of unknown activity levels. The values of the elements of the optimal activity-level vector, $\hat{W}$, are determined by using the well-known simplex method of linear programming. The optimal manning requirements (except for throughputs or fixed labor inputs) are then calculated by:

$$\hat{X} = A^{(3)}\hat{W}, \tag{12}$$

where $\hat{X}$ is the vector of labor inputs at optimal manning.

The mathematical structure of the model is based on linear relationships between the cost/subcost centers and determining optimal activity level vectors subject to quantified constraints.

The simplex method is based on the fact that, if there are m constraints (or rows) in the constraint matrix, and these are linearly independent, then there is a set of m columns (variables or vectors) which are also linearly independent. Hence, any Right Hand Side (RHS) can be expressed in terms of these m columns (called a basis). The simplex method uses these basic solutions, stepping from one to another (by exchanging one column in the basis with one column not in the basis on each step or iteration) until a solution (called a basic feasible solution) is obtained that satisfies all of the constraints and the requirement that all the column values be non-negative.

After a basic feasible solution is found, the simplex method steps along, examining a series of basic feasible solutions to find one that satisfies the requirement that the value of the functional (or objective) row be a maximum or minimum (the optimal solution). For the MAM, the objective function is in mathematical terms: Minimize $\cdot^{T}A^{(3)}W$. Not all LP problems have an optimal solution. If there is no solution in non-negative variables, or none that keeps the variables within their specified bounds, the LP problem is said to be <u>infeasible</u>. If a feasible solution is found, but the constraint rows do not confine the value of the functional row to finite values, the LP problem is said to be <u>unbounded</u>.

REFERENCES

a. Mathematical Programming System/360 (360A-CO-14X) Linear and Separable Programming - Users Manual, IBM.

b. Manpower Allocation Model, Volume 1, Final Report, Contract N00022-69-C-0076, Mellonics Systems Development Division, May 1969.

c. Mathematical Programming System/360 (360A-CO-14X) Control Language - Users Manual, IBM.

APPLICABLE CONSTRAINTS

Specific constraints were incorporated into the existing models to reflect certain unique features of the CNABATRA structure and its role in the pilot training process.

The analysis of NAS Pensacola tenant output led to the necessity of changing Program SUPER to accommodate a lower bound on intermediate products in order to reflect the consumption by tenant activities and throughputs. The constraints must be utilized for operation of the NAS Pensacola model because of the large percentage of products for selected subcost centers. The throughput consumption is not critical to the NAS Meridian model, but the capability is provided.

The unique case of VT10 also required a change to the portion of Program SUPER related to the assignment of output level constraints for this squadron. VT10 is not in the pilot flow process and the user has the option to specify an output level for VT10 which would be held constant through the various levels of pilot output. This option is exercised by employing a negative conversion factor in Program SUPER.

The CNABATRA process analysis models can accommodate upper and lower bounds on each variable labor input, policy constraints relating to combinations of variable labor inputs (i.e., only 20 percent of labor in a cost center may be civilian) lower bounds on the output (number of pilots trained) and intermediate products.

For the application at hand, the constraint equations include the lower bound on outputs and intermediate products. At the time of this application, there were no known bounds on the variable labor inputs specified by CNABATRA or the Chief of Naval Personnel.

Produc. Subcost Center	Distribution of Output	Receiving Cost Centers and Distribution Criteria	Quantity Received			
			Tech 1		Tech 2	
			Model	TP	Model	TP
1A30	Number of public affairs actions completed	All cost centers by % of military, civilians, and students	2098	3147	2015	3022
1A40	Number of legal cases handled	All cost centers by % of military, civilians, and students.	360	119	426	141
9931	Number of military population served by Chaplain's Off.	All cost centers by % of military, civilians, and students	1489	2891	1584	3075

Figure 2-5. Sample Application of Process Analysis Involving Throughputs (NAS Pensacola)

PILOT TRAINING RATE CONVERSION FACTORS

Conversion factors fix the final product output ratio from various training squadrons by accounting for the mix of the types of students required, the attritions, and total output requirements.

The range of final product output rate (FPOR) (i.e., trained pilots) may be specified for the Helo, Prop, and Jet systems of CNABATRA. The CNABATRA conversion factors shown in Figure 2-6 relate to the total pilot training process within CNATRA. Other system-to-system elements are possible and are explained in the users manual. Sample model output used Meridian and Pensacola (Sherman) as systems, and the associated squadrons as elements.

The models assume that pilots are trained at a constant rate throughout the time period of interest. The model could be made dynamic in this sense by the application of seasonal or cyclic variation analyses to account for "peaks and valleys" in training rates and resultant fluctuations in manpower requirements. In addition, the discrete, or "block", nature of the training syllabus could be accommodated in the model by "segmenting" the time period and simultaneously applying different training rates for different segments of the training process.

Table I - CNABATRA Conversion Factors for Jet, Prop, and Helo

TYPE OF OUTPUT TRAINING MIX	ELEMENT DESCRIPTION	NAVAL AIR STATION	TRAINING SQUADRON	POLICY ATTRITION RATE	COMPUTED CONVERSION FACTOR
HELO TRAINING 20.0%	PRIMARY T-34	SAUFLEY	VT1	15.0%	1.468
	BASIC PROP T-28	WHITING	VT3	14.0%	.724
	BASIC PROP-CARQUAL T-28	SAUFLEY	VT5	1.0%	.622
	PRE-HELO INSTRU T-28	SHERMAN	VT6	1.0%	.204
	PRIMARY HELO TH-57A	ELLYSON	HT8A	0.0%	.202
	ADVANCED HELO H-34/TH-1	ELLYSON	HT8B	0.8%	.202
PROP TRAINING 40.0%	PRIMARY T-34	SAUFLEY	VT1	15.0%	1.468
	BASIC PROP T-28	WHITING	VT3	14.0%	.724
	BASIC PROP-CARQUAL T-28	SAUFLEY	VT5	1.0%	.622
JET TRAINING 40.0%	PRIMARY T-34	SAUFLEY	VT1	15.0%	1.468
	BASIC JET-PHASE A T-2A&R	MERIDIAN	VT7	0.0%	.524
	BASIC JET-PHASE B T-28/C	MERIDIAN	VT9	13.0%	.524
	BASIC JET-GUN/CARQ. T-28	SHERMAN	VT4	1.4%	.456

Figure 2-6. CNABATRA Conversion Factors for Jet, Prop, and Helo

The Manpower Allocation Model (MAM) output gives a detailed report of manpower requirements for each subcost center for specified pilot training rates (PTR's).

The output of the MAM is a computer listing of manpower requirements for a PTR. The output, which contains manpower requirements to support PTR's (e.g., 2000-4000 pilots per year in increments of 250 per year) is organized for each of the naval air stations as shown in Figures 2-7, 2-8, and 2-9.

For each PTR, the first page contains the indication of the PTR (or FPOR) being examined. The FPOR for the system and the elements are included as shown in Figure 2-7.

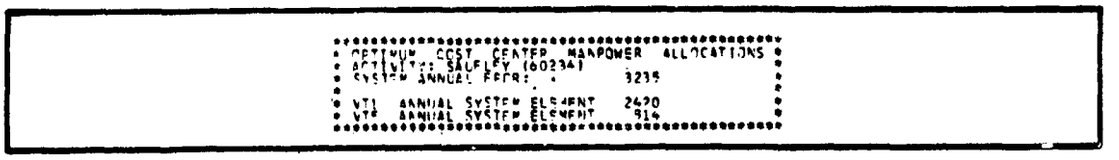


Figure 2-7. Sample Header Printout

The MAM printout prescribes manpower requirements for overall CNABATRA pilot training rates for NAS Saufley with VT1 and VT5; NAS Whiting with VT2 and VT3; NAS Ellyson with HT8; NAS Pensacola with VT4, VT6, VT10, and NAVSCOLCOM; and NAS Meridian with VT7 and VT9. Other PTR's may be defined (e.g., CNATRA) to make the MAM output relevant to other areas, by use of the BUPER program. A sample printout for NAS Saufley is given in Figure 2-8.

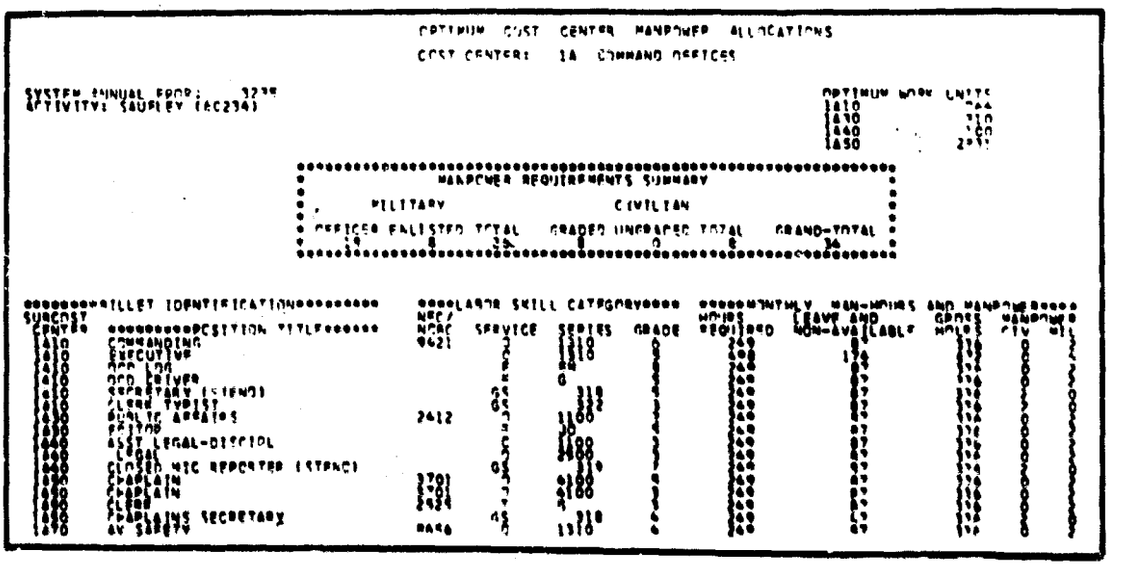


Figure 2-8. Sample Manpower Requirements Printout

The subsequent pages of output contain manpower requirements for each subcost center aggregated at cost center.

Cost Center - Provides the RMS PRIME cost center number and description (e.g., Cost Center 1A, Command Offices; Cost Center 1C, Comptroller, etc.). The report is organized by RMS cost center within each CNATRA annual PTR.

System Annual FPOR - Lists the annual number of pilots in all squadrons who have completed training at an activity.

Activity - Provides the name and accounting number of the naval air station for which manpower requirements are prescribed (e.g., NAS Saufley (60234)).

Optimum Work Units - Provides the standard ("should be") level of output for all subcost centers that produce intermediate products consumed by other cost centers. Subcost centers whose output is consumed within the cost center (e.g., administration) do not appear in this list, because they do not enter into the process analysis. These standard output values may be used to check actual performance (e.g. output at an operating PTR) in much the same way that a standard cost system is employed for management control purposes. These work units also provide the primary link in the integration between the PMM and MAM.

Manpower Requirements Summary - Indicates the requirements for each cost center by officers and enlisted men with subtotals, graded and ungraded civilians with subtotals, and a grand total of the number of persons needed at the cost center (e.g., officer 18, enlisted 8 (subtotal military 26), graded civilian 8, ungraded civilian 0 (subtotal civilian 8, grand total 34). Manpower requirements for a cost center or an activity may therefore be compared at increasing PTR's or across activities for similar cost centers at the same PTR.

Billet Identification - An input variable which provides the subcost center identification and title for each billet position (e.g., assistant legal officer, public affairs officer, clerk typist). Secondary NEC/NOBC and used if the billet identification was not provided.

Labor Skill Category - Provides, under the "service" column, the general labor classification ("O" for officer, "WO" for warrant officer, "E" for enlisted men, "GS" for graded civilians and "WG", etc., for ungraded or wage board civilians). The column labeled "Series" indicates the appropriate designator for officers, the rating for enlisted men, and the series for civilian personnel. When appropriate, based on input data, the primary NEC/NOBC also appears to further identify the particular labor skill category for billet assignment purposes. The rank, rate, or grade is also listed to indicate the proficiency level of the labor skill.

Monthly Manhours and Manpower - Provides the total manhours per month and the equivalent number of people in each labor skill category required in the cost center. The "Hours Required" column shows the required productive manhours per month for the skill category and level to support the indicated system PTR. The "Leave, Non-Available" column shows the non-productive manhours allowed each month for the skill category and level. There are minimum allowances for each labor type, but the numbers that appear may be greater than the minimum. However, the rounding procedures minimize the amount of this type of time for each series. The "Gross Hours" column shows the sum of "Hours Required" and "Non-Available" columns and represents the leave equivalent/total number of hours required each month. The "Total Manpower" column shows, separately, the total number of civilians and military required by skill category and level.

The last page of the requirments for the PTR contains a summary by officer, enlisted and civilian, graded and ungraded. A sample of this printout is shown in Figure 2-9.

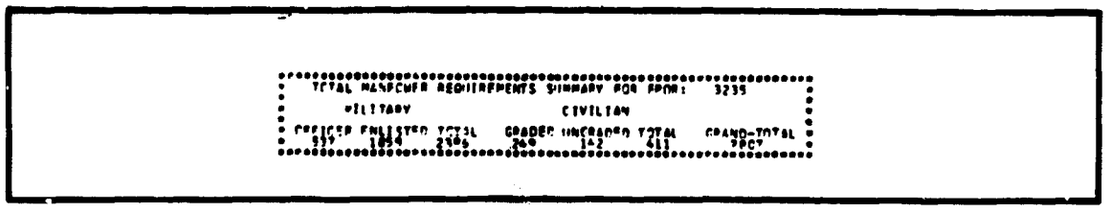


Figure 2-9. Sample of Summary Printout

ADDITIONAL MODEL OUTPUT

In addition to the principal output of the MAM, a listing by cost center of the least-cost manpower requirements necessary to support a specific output training rate, additional output is available to the manpower requirements analyst.

In addition to the manpower requirements, other information of a more analytic nature is available from the linear programming techniques. This information provides insight into the model structure of labor utilization and constraints and consists partially of the following:

1) values of dual variables;
2) values of slack variables;
3) ranges of student training rates for which labor is linear; and
4) labor cost changes which necessitate process substitution.

The values of the dual variables (also referred to as internal opportunity costs or shadow prices) are available from the linear programming computer output. These variables are numbers which represent the effect (value) of the constraints (right hand sides) on the objective function (least-cost labor mix cost) at the optimum. Mathematically, they are the rates of change of the objective function with respect to the right hand sides of the constraint relations evaluated at optimality. There is a unique dual variable corresponding to each of the constraint relations.

These dual variables have a further important economic interpretation, namely: Those products for whom the corresponding dual variables are equal to zero are <u>free goods</u>, in that some small additional amount of them may be used without increasing the cost of running the base. Otherwise, they represent the <u>unit cost</u> as represented by increasing the total base operating cost of requiring a small additional amount of some product. For example, if there is excess supply over demand for a product, this excess is a free good in that it doesn't involve any additional cost to use it. On the other hand, for a product (either intermediate or final) for which supply just equals demand, it will require operating some cost centers at higher activity levels to make more of this product available. Hence, there is a cost associated with the constraint on the goods. The general principle is that there are positive internal opportunity costs for those products for which the constraints (greater than or equal to) are binding. This is referred to as <u>complementary slackness</u> in mathematical programming.

Associated with each product (final or intermediate) is a slack variable. Corresponding to each product is an equation or inequality. The value of this variable represents the excess of production over consumption, and this quantity is non-negative. Thus, the value of the slack variable represents the amount of "fat" in the system.

It will be positive for free goods and, as discussed above, is intimately connected with the dual variables. Mathematically, a constraint is binding when the associated slack variable is zero.

Items (3) and (4) above are obtained by what is referred to as parametric linear programming. This is not currently part of the linear programming output. To obtain such information, the proper computer commands must be added to the MPS part of the data processing system. This is not envisioned as a major computer programming task.

By use of parametric linear programming (a standard part of the Mathematical Programming System (MPS) of the IBM 360/67 computer), it is possible to determine the ranges of student training rates where labor demands are linear. This may be analyzed for both individual cost centers or an entire facility. This technique may also be used to investigate the impact of labor cost changes on optimal manning requirements. The obvious impact is that if individual costs go up, so will the total cost of running a base. However, it is possible that costs can change in such a way that the manner in which a cost center is organized/operated will have to be changed.

SECTION 3

PRODUCTIVITY MEASUREMENT MODEL

DESCRIPTION

DATA SOURCES AND FLOW

> The Productivity Measurement Model uses monthly RMS PRIME data to form a variety of measures which are aggregated to successively higher levels.

The RMS PRIME data, used as inputs for the Productivity Measurement Model (PMM), is shown in Figure 3-1. For each subcost center and time period covered, the inputs are:

1) number of work units performed or accomplished:
2) number of productive military and civilian labor hours expended;
3) amount of military and civilian labor dollars expended.

This data is directly available from the RMS PRIME 7000-3 reports. The military and civilian labor hours and labor dollars are summed in the program to provide the model with total labor hours and total labor dollars for each subcost center by time period.

Conventional productivity measures which are the unweighted ratio of output (in work units) divided by input (in dollars or manhours) are computed directly from the RMS PRIME data. Since these conventional productivity measures have no normalizing criterion, they generally cannot be meaningfully compared either horizontally, among subcost centers performing similar functions, or vertically, among subcost centers performing dissimilar functions.

The PMM forms a standard productivity measure (SPM_S) by dividing the cumulative total work units produced in the subcost center by cumulative total labor costs (Figure 3-1). This standard (the cumulative average productivity measure in dollars) is automatically updated by the program.

The use of the cumulative average of past productivity measurements as a standard (historical) has the advantage that it smooths out fluctuations in the monthly data. An alternate method of computing a historical standard is to determine a moving average. Still another type of standard is the engineered standard. Data for this type of standard is not available in RMS PRIME reports, but can be obtained from work sampling data, 3M data, or other technical sources.

The productivity model forms a productivity index (PI) for each subcost center by dividing the conventional productivity measure (CPM_S) by the standard (SPM_S), (Figure 3-1). The standard is, thus, a general normalizing criterion. All subcost centers can be compared on the basis of how well they produced in relation to their own standard. The productivity index is then used to calculate the production measure (PM) of the output of the subcost center (Figure 3-1). This is formed by multiplying the labor productivity index by the labor costs, and is a measure of the

value of the output.

By summing the PM's of the subcost centers, the model forms a measure of the total output value of the total productivity measure (TPM) of the cost center. When this is divided by the total labor costs (TLC), the result is an aggregate productivity index for the whole cost center, which is an average of the productivity indices of the subcost centers weighted by their labor costs. By summing the total production measures and labor costs to the station or major command level, similar productivity indices for the entire station or major command are formed (Figure 3-1).

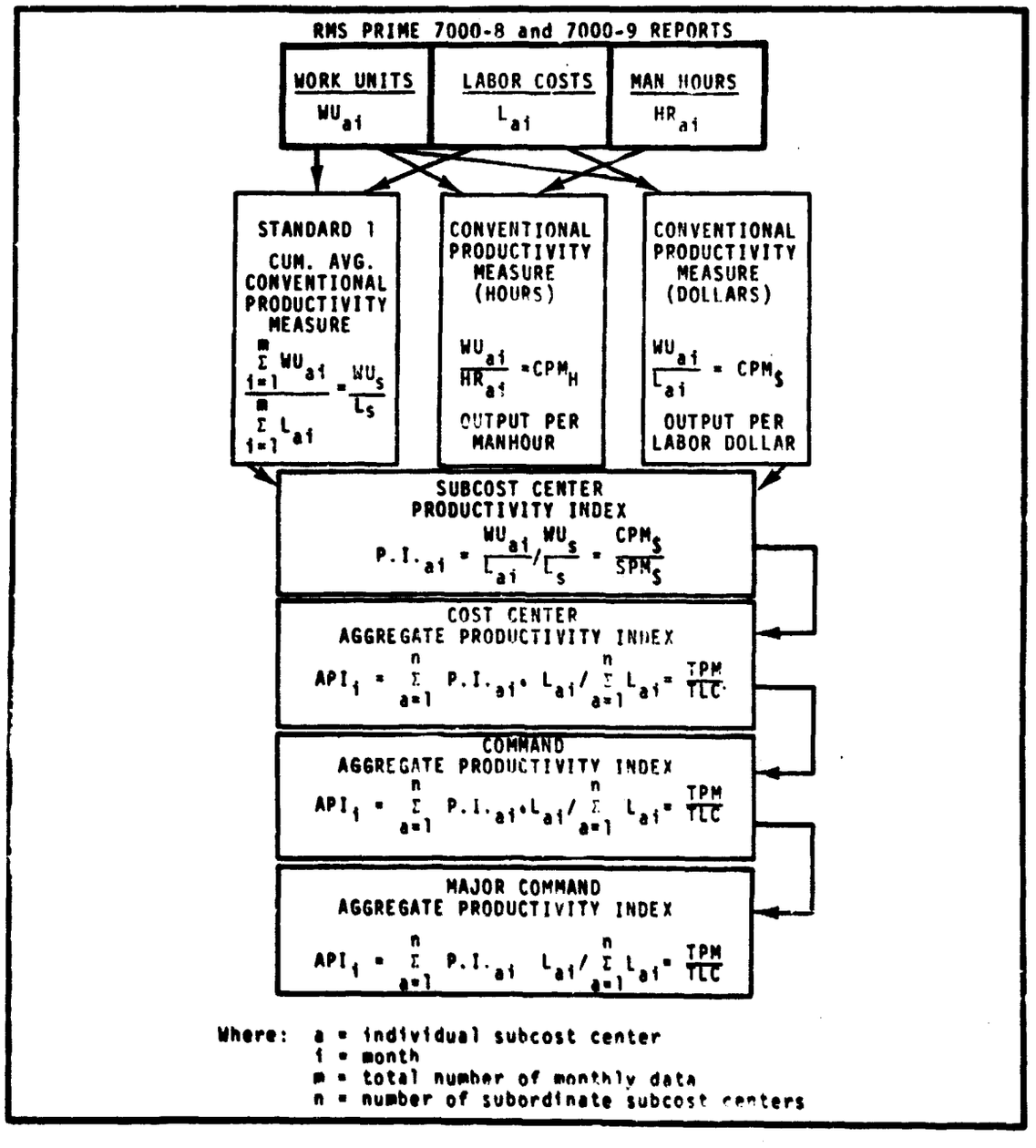


Figure 3-1 Data Sources and Flow in the Productivity Measurement Model

LIMITATIONS AND ASSUMPTIONS OF THE PMM

> **The PMM is basically only limited by the validity and meaningfulness of the data it uses. The basic assumptions made are that the data are valid and implicitly that high productivity is better than low productivity.**

Aside from the basic assumptions of the data validity and the positive value of higher productivity indices, the program also assumes that if a subcost center does not report any work units that it has a productivity index of 1.0. This assumption is made only to minimize the effect of these subcost centers on the aggregate productivity indices of their superior units, and the productivity index for the subcost center is printed out as zero. The limitations and assumptions of the PMM effect the CNABATRA productivity measurements when one of the following is true:

1. Work units do not accurately reflect the output.
2. A high productivity or a high ratio of work units to labor costs is not desirable.
3. The standard productivity does not reflect what the output per labor dollar should be.
4. The data is incorrect.

The first case presents a serious limitation to the interpretation of the productivity measurement for subcost center 6C50, Ground Electronics Maintenance. The work unit that appears is Cubic Feet of Electronic Devices Repaired. This work unit is too gross to reflect any meaningful change in productivity.

The second case is most often a limitation for the productivity of supporting activities at CNABATRA. For example, a very high productivity for the chaplain's office would not be desirable. Since its work unit is the number of persons served, a high output per labor dollar would generally mean that there was inadequate chaplain service. The more people they serve, the less service they can give to each person.

The third case can present a limitation to the meaningfulness of a productivity index and the subsequent aggregate indices which use it even when the basic RMS data is valid and meaningful. For example, if a cumulative average is used as a standard, then poor management over a period of time will make the standard lower than it should be and thus the productivity indices will be higher than they should be. Likewise, exceptionally good management might develop a standard which is higher than should normally be expected.

The fourth case (i.e., bad data) will clearly render productivity measures meaningless. Radical changes in productivity indices should not be accepted until the data has been confirmed. Thus the PMM can be used as a means of checking for errors in the RMS data, prior to utilization of this data for the MAM.

SECTION 4

MANPOWER ALLOCATION MODEL AND PRODUCTIVITY MEASUREMENT MODEL APPLICATIONS

RELATIONSHIP OF MODELS TO PPBS

> The Manpower Allocation and Productivity Measurement Models are designed to be directly useful in the Planning Programming and Budgeting System (PPBS) of the Department of Defense which requires an exchange of information and data related to manpower requirements and the justification of these requirements.

The PPBS requires extensive formal dialogue relative to Navy manpower and involves several activities within the DoD and Department of the Navy. At any one point in time, these activities may be concerned with manpower requirements for five different fiscal years. For example, work on the FY'72 budget began in February 1969 with the receipt of the update of the Department of Defense five-year defense program (FYDP). As the dialogue continues (Figure 4-1) more constraints are defined in terms of the force level requirements, budget limitations, policies related to the number and mixture of personnel available, and, finally, constraints related to detailing specific individuals to fill the defined manpower requirements. More constraints are defined as the time for implementing the particular budget approaches. In general, there are at least three levels at which they are applicable in the PPBS.

First, the allocation model can be used to generate unconstrained Navy manpower requirements as a function of total planned Navy forces. An example of this use would be as an input from the Office of the Chief of Naval Operations (OpNav) to the Joint Chiefs of Staff (JCS) for the Manpower Annex of the Joint Strategic Objectives Plan, Volume II, Force Tabulations.

Second, the allocation model can be used to generate Navy manpower requirements/allocations as a function force size, such allocations to be generally constrained by total Navy personnel end strength or payroll dollars. Examples of this use would be in OpNav response to OSD Manpower Program Memoranda, JCS Joint Force Memoranda, Navy Program Objectives Memoranda, and to prepare Program Change Requests, Reclamas, and Five-Year Defense Program updates in the annual Planning, Programming and Budgeting cycle.

Third, the allocation model can be used to generate manpower allocations in implementation of program and budget decisions, and as specifically constrained by the inventory of personnel available to the Navy in the short run. The principal users of the models in this mode would be OpNav for manpower authorizations and BuPers for personnel distribution.

Each manpower allocation model developed has used the same basic structure of process analysis and linear programming to evaluate manpower requirements. These are predictive models used to determine the optimum (least cost) mix of labor

(described in terms of service, series, grade, and NEC/NOBC) to produce a required shore activity output. In addition to this basic model formulation, a method for the competitive bidding for labor resources has been developed.[1] This scheme, in effect, "forces" managers to more efficiently use the types of labor which are abundant at a particular time. Finally, when a particular mixture of labor has been assigned to a shore activity, the effectiveness of this labor force can be measured by means of the appropriate productivity measurement model.

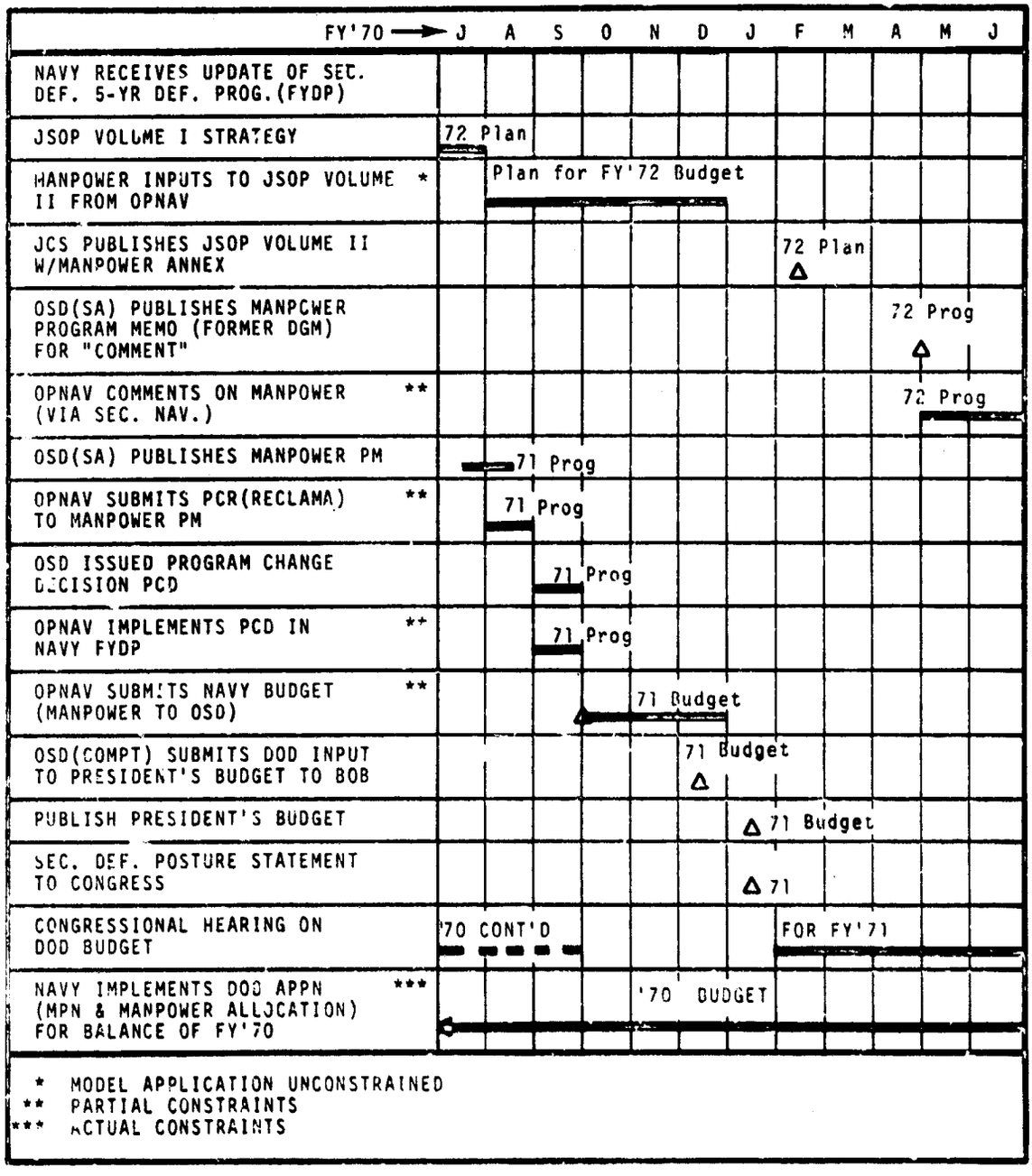


Figure 4-1. PPBS Activities Relating to Manpower in FY'70

1. Manpower Allocation Model, Final Report, Contract N00022-69-C-0076, May 1969

CONTINUOUS MODEL APPLICATIONS IN THE PPBS

> In the continuing process of responding to the PPBS dialogue, the models are not intended to be static tools.

A planned program of model applications is required in order to seek more nearly optimal solutions in response to the PPBS requirements over time. These models are of complex organizations or systems in which many intangibles, such as management capability, morale, environment, etc., bear directly on the performance and capability of the shore activity. Thus, it would be unrealistic to take a "snap shot" of a navy shore establishment and use this data to describe the operation at some later time.

If the models are applied periodically over time in synchronization with the PPBS cycles, the net effect would be two-fold. First, more realistic data can be provided in the PPBS dialogue. Second, the establishment would be "forced" to more nearly optimum use of manpower. The scheme by which this could be accomplished is illustrated in Figure 4-2. Initially, actual historical data is used to form the two technologies. This data is derived from RMS PRIME, OPNAV reports, and related sources. Each level of model application described above (unconstrained, partially constrained, and constrained) results in an optimal least-cost solution. This solution then becomes, in effect, a requirement, or plan, in the PPBS at the appropriate level. In practice for numerous reasons, the plan may not be completely achieved. This fact may be determined from actual data (RMS PRIME, etc.). In subsequent applications of the model, the previous optimum solution can be used to form one technology, and the actual performance data (RMS PRIME) can be used for the second technology. The resulting optimum solution would then reflect, in effect, what is derived and what can be achieved. This successive model application is not unlike the functioning of a missile guidance system. Based on previous data, the guidance system generates a solution (steering command) for impact on the target. Due to errors inherent in the system or a target maneuver, the current solution can be in error. As updated data (scan of the guidance radar, for example) is received, a new solution with new steering commands is provided. This interrelationship between prediction and measured data results in the optimum solution; namely, impact of missile on target.

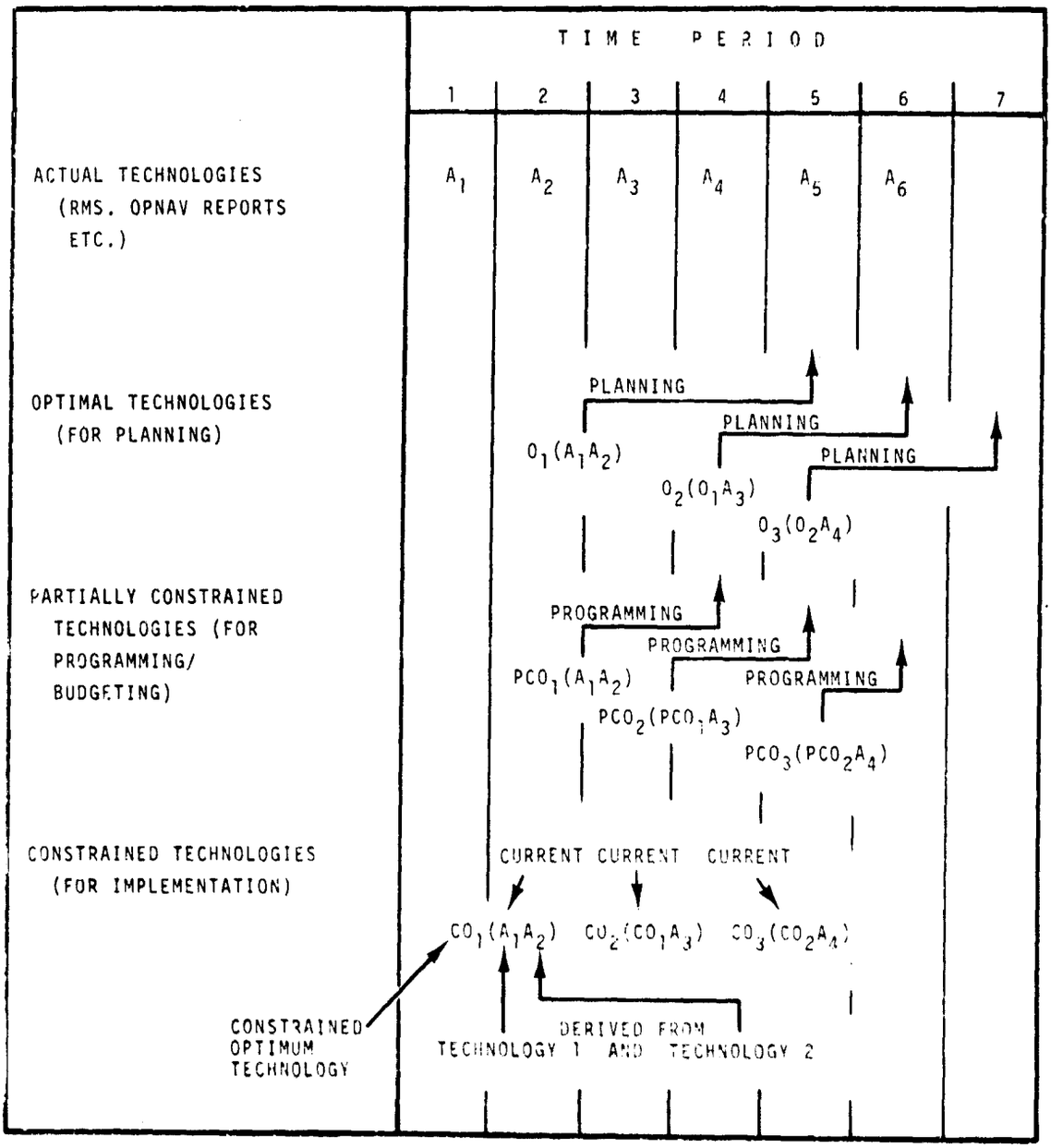


Figure 4-2. Continuous Model Usage in PPBS

RELATIONSHIP OF THE MANPOWER ALLOCATION MODEL AND PRODUCTIVITY MEASUREMENT MODEL

The Manpower Allocation Model is used to determine optimum manpower allocation and is used in conjunction with the Productivity Measurement Model.

The productivity measurement provides a measure of the efficiency of allocating labor resources. A knowledge of the productivity levels and trends is essential for estimating optimum manpower needs and allocations accurately. The manpower allocation and productivity measurement models complement each other. The manpower allocation model is predictive, and the productivity measurement model is basically analytical. The manpower allocation model tells what the outputs and labor inputs should be at an optimum level of operation. The productivity measurement model shows the actual ratio of outputs to labor costs and manhours. The ratio of outputs to inputs at optimality in the allocation model can be used as a standard in the productivity model. The use of this ratio as a standard has several advantages. First, the productivity model can be used to verify the predictions of the allocation model. Second, the standard is more realistic than the average of past productivities, since the allocation model considers shortages and excesses in various labor categories and the resulting need to trade off one type of labor for another.

An example of the possible interaction of the results of the productivity measurement model to the manpower allocation model can be demonstrated by considering hypothetical data from a single cost center, 4D Dental Facilities, at NAS Whiting. For this example, the productivity measurements for the two time periods are shown in Figure 4-3. The effect which a difference in productivity can have on manpower allocation can be seen by comparing the manpower requirements when high productivity is used (Figure 4-4) and when the period of low productivity is used (Figure 4-5).

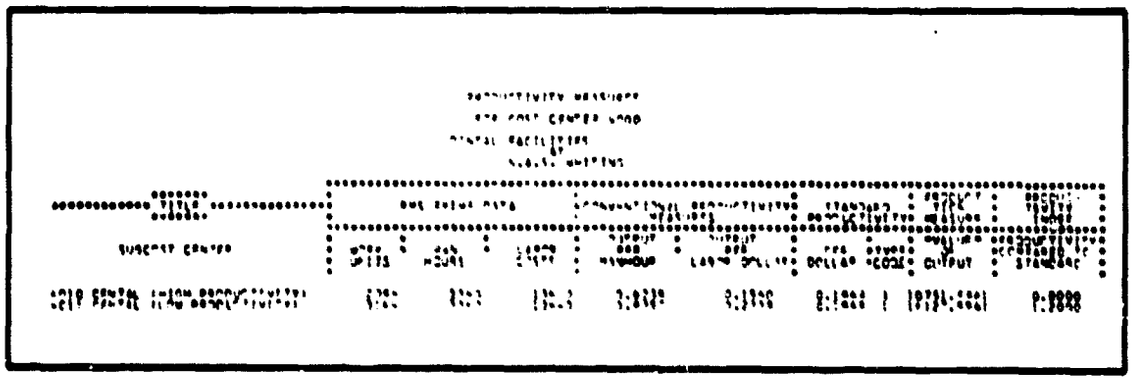


Figure 4-3. Sample Comparative (High/Low) Productivity Measurements

OPTIMUM COST CENTER MANPOWER ALLOCATIONS
COST CENTER: 40 DENTAL FACILITY

CNABATRA ANNUAL PTR: 2500
ACTIVITY: WHITING (60508)
ANNUAL SQUADRON PTR: VT2 2000
ANNUAL SQUADRON PTR: VT3 2000

OPTIMUM WORK UNITS
4010 2096

MANPOWER REQUIREMENTS SUMMARY

MILITARY			CIVILIAN			
OFFICER	ENLISTED	TOTAL	GRADED	UNGRADED	TOTAL	GRAND-TOTAL
6	14	20	4	0	4	24

BILLET IDENTIFICATION		LABOR SKILL CATEGORY				MONTHLY MAN-HOURS AND MANPOWER				
SUBCOST CENTER	POSITION TITLE	NEC/ NOBC	SERVICE	SERIES	GRADE	HOURS REQUIRED	LEAVE AND NON-AVAILABLE	GROSS HOURS	MANPOWER CIV	MANPOWER MIL
10	DENTAL	0365	0	2200	5	155	13	168	0	1
10	AST DENTAL	0335	0	2200	4	412	92	504	0	3
10	AST DENTAL	0335	0	2200	3	310	26	336	0	2
10	DENTAL ASST		E	DN	3	879	129	1008	0	6
10	PROSTHETIC		E	DT	6	477	195	672	0	4
10	DENTAL ASST		E	DT	5	465	39	504	0	3
10	DENTAL ASST		E	DT	4	155	13	168	0	1
10	CLERK		GS	301	2	219	117	336	2	0
10	DENTAL HYGIENIST		GS	682	5	219	117	336	2	0

Figure 4-4. Sample High Productivity Measurements

OPTIMUM COST CENTER MANPOWER ALLOCATIONS
COST CENTER: 40 DENTAL FACILITY

CNABATRA ANNUAL PTR: 2500
ACTIVITY: WHITING (60508)
ANNUAL SQUADRON PTR: VT2 2000
ANNUAL SQUADRON PTR: VT3 2000

OPTIMUM WORK UNITS
4010 2096

MANPOWER REQUIREMENTS SUMMARY

MILITARY			CIVILIAN			
OFFICER	ENLISTED	TOTAL	GRADED	UNGRADED	TOTAL	GRAND-TOTAL
9	21	30	6	0	6	36

BILLET IDENTIFICATION		LABOR SKILL CATEGORY				MONTHLY MAN-HOURS AND MANPOWER				
SUBCOST CENTER	POSITION TITLE	NEC/ NOBC	SERVICE	SERIES	GRADE	HOURS REQUIRED	LEAVE AND NON-AVAILABLE	GROSS HOURS	MANPOWER CIV	MANPOWER MIL
10	DENTAL	0365	0	2200	5	232	104	336	0	2
10	AST DENTAL	0335	0	2200	4	618	54	672	0	4
10	AST DENTAL	0335	0	2200	3	456	39	504	0	3
10	DENTAL ASST		E	DN	3	1318	194	1512	0	9
10	PROSTHETIC		E	DT	6	716	124	840	0	5
10	DENTAL ASST		E	DT	5	689	142	840	0	5
10	DENTAL ASST		E	DT	4	232	104	336	0	2
10	CLERK		GS	301	2	327	177	504	3	0
10	DENTAL HYGIENIST		GS	682	5	327	177	504	3	0

Figure 4-5. Sample Low Productivity Measurements

SECTION 5

MODEL INPUTS

The complete listing of the raw labor inputs forms a basis for the generation of manpower assignments for each specified level of final product output rate. The list of consumers at tenant and throughput activities forms a basis for the ratio of cost center production in support of these activities.

The following is a complete listing of labor inputs for each of the five naval air stations of CNABATRA: Saufley, Ellyson, Whiting, Sherman, and Meridian. Each page will contain a specific cost center with the skill levels (officer, warrant officer, enlisted, and wage board) allocated. Notice that each rank or rating contains many different categories or designations. The MAM accepts each labor skill category as a unique input.

Figure 5-1 defines the tenant and throughput activities included in the study. Figure 5-2 shows the consumption population of tenant activities. Figure 5-3 shows the throughput population. The squadrons are included to indicate type of support received, which is quantified in the model program. The LSR (OPNAV Form 4000/2) designation for service is included for correlation to the subcost center assumed as providing the service.

Figure 5-4 shows the percentage of production for tenants and throughput activities. This percentage was applied to the lower production figure of the two technologies in order not to bias the LP selection, and the result was used for a lower bound on the production for the subcost center.

The LSR did not contain detailed information on the type of supply support provided tenant activities. The assumption was made that this support was similar to that for Cost Center 2142, and the supported population percentage (69%) was used for the following supply subcost centers: 2131, 2145, 2136, 2124 and 2121.

Figures 5-5 and 5-6 show the output reported for the training activities at NAS Pensacola and Meridian. Reporting of the Indoctrination course via the Weekly Aviation Statistical Report was not initiated until the 26 Jan 1969 report. To prevent misleading bias the data for the week of 26 January was used for weeks ending on 05, 12, and 19 January.

This report uses Pensacola and Sherman interchangeably to refer to the CNABATRA training activity at NAS Pensacola.

1A COMMAND/EXECUTIVE OFFICES

SAUFLEY

LABOR TYPE AND GRADE			
CAPT	1310,		
CDR	4100,	1313,	
LT	2500,	1105,	4105,
LTJG	1103,		
E-7	ENC,		
E-5	RM2,	JO2,	
E-3	AN,		
GS-7	310,		
GS-5	318,		
GS-4	318,		
GS-3	322,		

1C COMPTROLLER

SAUFLEY

LABOR TYPE AND GRADE		
GS-11	560,	
GS-7	540,	
GS-5	530,	501,
GS-4	530,	
GS-2	530,	

1D CIVILIAN PERSONNEL

SAUFLEY

LABOR TYPE AND GRADE	
GS-10	[illegible]
GS-5	318,

1E MILITARY PERSONNEL

SAUFLEY

LABOR TYPE AND GRADE				
LTJG	1105,			
E-8	SCPO,			
E-6	[illegible]	[illegible]		
E-7	[illegible]	[illegible]		
E-6	[illegible]	[illegible]	MM1,	[illegible]
E-5	YN2,	[illegible]	[illegible]	[illegible]
E-4	[illegible]	[illegible]		
E-3	[illegible]	[illegible]	[illegible]	[illegible]
E-2	SA,	[illegible]		
GS-3	[illegible]	[illegible]		
WG-2	3500,			

1F SPECIAL SERVICES

SAUFLEY

LABOR TYPE AND GRADE			
ENS	1350,		
E-8	[illegible]		
E-6	MM1,		
E-5	MM2,	MM2,	EN2,
E-4	AMS3,		
E-3	SN,		
E-2	SA,		
GS-8	[illegible]		
GS-4	301,		
GS-4	1411,	188,	
GS-3	2005,		
WG-2	3502,		

1J ADMINISTRATIVE SERVICES

SAUFLEY

LABOR TYPE AND GRADE		
E-3	SN,	
GS-6	[illegible]	
GS-5	[illegible]	
GS-4	312,	
GS-3	[illegible]	
GS-2	[illegible]	[illegible]

2G FUEL SERVICES

SAUFLEY

LABOR TYPE AND GRADE	
E-5	[illegible]
E-3	[illegible]
WG-10	[illegible]
WG-8	[illegible]
WG-8	[illegible]
WG-7	[illegible]
WX-07	[illegible]

2H RETAIL OPERATIONS

SAUFLEY

LABOR TYPE AND GRADE		
E-8	[illegible]	
E-7	[illegible]	
E-5	[illegible]	[illegible]
E-4	[illegible]	[illegible]
E-3	SA,	[illegible]
GS-4	[illegible]	
WG-6	[illegible]	
WG-5	[illegible]	
WG-4	[illegible]	

2N FOOD SERVICES

SAUFLEY

LABOR TYPE AND GRADE		
WG- 2	7??C,	
E- 8	CSCM,	
E- 7	CSC,	
E- 6	SK1,	CS1,
E- 5	[illegible],	CS2,
E- 4	CS3,	
E- 3	CSSN,	
GS- 3	[illegible],	
WG- 7	470C4,	
WG- 8	74CC4,	
WG- 2	47CC8,	

4A MEDICAL SERVICES

SAUFLEY

LABOR TYPE AND GRADE		
LT	21C5,	
E- 8	HMCS,	
E- 7	HMC,	
E- 6	HM1,	
E- 5	HM2,	
E- 4	HM3,	
E- 3	HN,	
E- 2	HA,	
GS- 5	[illegible],	
GS- 3	[illegible],	[illegible],

6A COMMUNICATIONS

SAUFLEY

LABOR TYPE AND GRADE		
ENS	11C5,	
GS- 3	[illegible],	3?5,
GS- ?	[illegible],	

4D DENTAL SERVICES

SAUFLEY

LABOR TYPE AND GRADE	
CAPT	22CC,
LT	22CC,
E- 6	DT1,
E- 5	DT2,
E- 4	DT3,
E- 3	DN,
GS- 4	[illegible],

6F OPERATIONS OF AIRCRAFT

SAUFLEY

LABOR TYPE AND GRADE				
LT	7?C?,			
E- 6	ADR1,	AMS1,	AEH1,	
E- 5	ADR2,	AMS2,	ATN2,	[illegible],
E- 4	ADR3,	AMS3,	AMH3,	TAN3,
E- 3	AMHAN,	AN,	[illegible],	[illegible],

6C AIR OPERATIONS

SAUFLEY

LABOR TYPE AND GRADE			
CDR	1312,		
LT	4EC?,	132C,	
E- 8	AECM,		
E- 7	STC,	ACC,	
E- 6	ST1,	[illegible],	AC1,
E- 5	AC2,	?TN2,	AC2,
E- 3	PHAN,	AN,	
GS-10	21??,		
GS- 5	[illegible],		
GS- 8	21??,		
GS- 7	21??,		
GS- 6	1C4C,		
GS- 4	322?,		
GS- 3	322?,		
WG-12	24C??,		
WG-11	24C14,		
WG-10	24CC8,		
WG- 8	24C14,		

6J TRAINING, GENERAL

SAUFLEY

LABOR TYPE AND GRADE		
LT	132?,	
E- 6	[illegible],	[illegible],
E- 5	[illegible],	
E- 4	[illegible],	[illegible],
E- 3	[illegible],	
GS- 5	[illegible],	
GS- 3	[illegible],	

AA AIRCRAFT MAINTENANCE

SAUFLEY

LABOR TYPE AND GRADE

COD		1315,
LT		6662,
WG-	4	741C,
WG-	3	741C,
GS-	9	AFCM,
GS-	8	ADCS, AMCS,
GS-	7	ASC, ATC, AZC,
GS-	4	PR1, ADR1, AMS1, AMH1, AT1, AC1,
GS-	5	ADR2, MR2, PR2, ATN2, AMS2, AMH2, AF2,
GS-	4	ADR3, PR3, ATN3, AMS3, AF3,
GS-	3	AFAN, AMHAN, ADRAN, PRAN, AN, ATAN, AMSAN,
GS-	2	AA,

SA40 VT1

SAUFLEY

LABOR TYPE AND GRADE

COD		6P32, 131C, 1315,
LT		131C,
FAS		1322,
WG-	4	7612,
GS-	8	ADCS, AMSC,
GS-	7	ADRC, PRC, AMHC, AFC, AKC, AZC, AMSC,
GS-	5	ANH1, PR1, ADR1, AMS1, AMH1, AS1, AZ1, AC1, AT1,
GS-	6	AK2, ADR2, PR2, ATN2, AZ2, AMS2, AMH2, AF2,
GS-	4	ADR3, PR3, AR3, AZ3, AMH3, AMS3, AC33,
GS-	3	ATNAN, AMHAN, AZAN, PRAN, ADRAN, AN, AN, AKAN, AZAN,
GS-	2	AA,
GS-	3	322, 3C1,
WG-	5	7641,

SE40 VT5

SAUFLEY

LABOR TYPE AND GRADE

COD		131C,
LT		6P52, ASCC,
FAS		1322,
GS-	8	AMCS, ADCS,
GS-	7	ADRC, AMHC, ATC, AFC, AKC, AKC,
GS-	6	AD21, PR1, AZ1, AMS1, AMH1, AC1, AK1, AT1,
GS-	5	AMH2, ADR2, FM2, FN2, PR2, AMS2, ATN2, AMF2, AMH2, AF2, AZ2,
GS-	4	ADR3, PR3, AZ3, AK3, ATN3, AMF3, AMH3, AF3, AMS3,
GS-	3	AFAN, AMFAN, ATNAN, AMHAN, AZAN, ADRAN, AFAN, AZAN, AN, AMSAN,
GS-	2	AA,
GS-	3	322,
WG-	7	6PC42, 57C52,
WG-	6	5401,

1A COMMAND/EXECUTIVE OFFICES

ELLYSON

LABOR TYPE AND GRADE		
CAPT	1310,	
CDR	1310,	
LCDR	4100,	
LT	4100,	2505,
LTJG	1325,	
E- 7	MMC,	
E- 6	YN2,	J02,
E- 3	SN,	
E- 2	SA,	
GS-11	802,	
GS- 9	1081,	
GS- 7	319,	1020,
GS- 6	318,	
GS- 5	1082,	
GS- 3	322,	

1B MANAGEMENT ENGINEERING

ELLYSON

LABOR TYPE AND GRADE	
E- 3	YNSN,
GS-11	343,
GS- 4	312,

1C COMPTROLLER

ELLYSON

LABOR TYPE AND GRADE	
GS- 9	560,
GS- 7	560,
GS- 5	820,
GS- 4	520,
GS- 3	560,

1D CIVILIAN PERSONNEL

ELLYSON

LABOR TYPE AND GRADE	
E- 7	MMC,
GS- 3	322,

1E MILITARY PERSONNEL

ELLYSON

LABOR TYPE AND GRADE						
LT	1325,					
LTJG	1105,					
E- 9	BMCM,					
E- 7	BTC,	EMC,	MMC,	YNC,	BMC,	
E- 6	PN1,	SH1,	EN1,	ABH1,	BM1,	MM1,
E- 5	YN2,	QM2,				
E- 4	PN3,	EM3,				
E- 3	PNSN,	SN1,	SN,	AN,		
E- 2	SA,					
GS- 8	110,					
GS- 4	204,					

1F SPECIAL SERVICES

ELLYSON

LABOR TYPE AND GRADE			
LT	1105,		
E- 4	MM1,	DC1,	EN1,
E- 5	MM2,	SH2,	
E- 4	EN3,		
E- 3	AN,	YNSN,	
E- 2	AA,		
GS- 6	188,		
GS- 5	801,		
GS- 4	1411,		

1J ADMINISTRATIVE SERVICES

ELLYSON

LABOR TYPE AND GRADE		
CDR	1310,	
GS- 4	342,	
GS- 5	308,	204,
GS- 4	308,	322,
GS- 3	322,	
GS- 2	308,	
GS- 1	350,	

2G FUEL OPERATIONS

ELLYSON

LABOR TYPE AND GRADE					
WG- 6	69064,				
WX-47	54061,				

2H RETAIL OPERATIONS

ELLYSON

LABOR TYPE AND GRADE					
GS- 8	SK8S,				
GS- 7	SK8,				
GS- 6	SK1,	AK1,	ADR1,		
GS- 5	AK2,	SK2,	ARF2,		
GS- 4	AK3,	SK3,	ARF3,		
GS- 3	AKAN,	AN,	SN,	SKAN,	ARFAN,

2N FOOD SERVICES

ELLYSON

LABOR TYPE AND GRADE						
LTJG	1105,	3105,				
GS- 8	SOCS,					
GS- 7	SOC,	SKC,	AREC,	CSC,		
GS- 6	SO1,	CS1,	SF1,	SK1,	BM1,	
GS- 5	SO2,	CS2,	MM2,	FN2,		
GS- 4	SO3,	CS3,				
GS- 3	TN,	SN,	CSSN,	AN,	SA,	
GS- 2	TA,	AA,	SA,			

4A MEDICAL SERVICES

ELLYSON

LABOR TYPE AND GRADE				
LT	1205,	2105,		
GS- 7	HMC,			
GS- 6	HM1,	PT1,		
GS- 5	HM2,	MM2,		
GS- 4	HM3,	ASM3,		
GS- 3	AN,	HN,		
GS- 2	AA,			

4D DENTAL SERVICES

ELLYSON

LABOR TYPE AND GRADE			
CDR	2200,		
LT	2200,		
GS- 5	DT2,		
GS- 4	DT3,		
GS- 3	DN,	SN,	
GS- 2	AA2,		

6A COMMUNICATIONS

ELLYSON

LABOR TYPE AND GRADE			
ENS	1355,		
GS- 7	RMC,		
GS- 5	RM2,		
GS- 4	CYN3,		
GS- 3	CYNSN,	SN,	

6C AIR OPERATIONS

ELLYSON

LABOR TYPE AND GRADE			
CDR	1310,		
LCDR	1317,		
LT	1102,		
ENS	1355,		
GS- 7	ACC,	PHC,	
GS- 6	AC1,	PH1,	
GS- 5	AC2,	PH2,	
GS- 4	AC3,	PH3,	
GS- 3	ACAN,	AN,	
GS- 5	1060,		
GS- 4	318,		

6J TRAINING, GENERAL

ELLYSON

LABOR TYPE AND GRADE			
CDR	131C,		
LCDR	131C,	131F,	
LT	131C,		
GS- 7	TDC,		
GS- 6	TD1,		
GS- 5	TD2,		
GS- 4	TD3,		
GS- 3	TDAN,	AN,	
GS- 6	318,		

A9 AIRCRAFT MAINTENANCE

ELLYSON

LABOR TYPE AND GRADE	

AA AIRCRAFT MAINTENANCE

ELLYSON

LABOR TYPE AND GRADE		
CDR	1312,	
LCDR	6852,	
LT	6852,	
GS- 8	AMCS,	
GS- 7	A70,	
GS- 6	A71,	
GS- 5	A72,	
GS- 4	A73,	
GS- 3	YNSN,	AN, A70N,
GS- 4	318,	
GS- 3	322,	

SH40 HT8

ELLYSON

LABOR TYPE AND GRADE		
LCDR	1331,	6852,
LT	1310,	6852, 1370,
LTJG	1370,	
ENS	1300,	7400,
GS- 8	AMCS,	ADCS, AMSC,
GS- 7	A0C,	AKC, ADJC, AMSC, ADPC, AMHC, AMCC, AEC, ATC, ATCS,
GS- 6	AMH1, PR1,	A71, AMS1, ADR1, ADJ1, AT1, AE1, AME1, ADI, AK1, AS1,
GS- 5	ADR2, A72,	AK2, AMH2, ADJ2, AMS2, AE2, PR2, ATN2, ATS2, AMC2, ASH2,
GS- 4	AE3, ASM3,	ADR3, ADJ3, AMS3, AMH3, PR3, AK3, AV2, A73, ATN3, AMC3, ARM3,
GS- 3	ADRAN, AENA,	PRAN, AN, AMHAN, ADJAN, ATAN, AMSAN, ATNAN, 1331, AEAN, AMCAN,
GS- 2	AMSAA,	AA, ADRAA, ADJAA, AMHAA,
GS- 8	319,	
GS- 3	322,	
GS- 2	323,	

1A COMMAND

WHITING

LABOR TYPE AND GRADE					
CAPT	131C,				
CDR	131C,				
LCDR	1317,	41CC,			
LT	41CC,	11CF,	25CF,		
LTJG	4100,				
E- 9	RMCM,				
E- 7	RMC,				
E- 6	RTI,	MM1,			
E- 5	JO2,				
E- 4	JO3,	YN3,			
E- 3	JOSN,	AN,			
GS- 9	1082,	312,			
GS- 6	318,	318,			
GS- 5	1082,				
GS- 4	318,				
GS- 3	322,				

1C COMPTROLLER

WHITING

LABOR TYPE AND GRADE	
LCDR	3100,
GS- 5	5C1,
GS- 4	5C1,

1D CIVILIAN MANPOWER MGT.

WHITING

LABOR TYPE AND GRADE	
GS-11	201,
GS- 7	203,
GS- 6	203,
GS- 3	322,

1E MILITARY PERSONNEL

WHITING

LABOR TYPE AND GRADE				
CDR	11CO,			
LT	A2C1,	11CF,		
E- 9	PNCM,			
E- 8	PCCS,			
E- 7	PMC,			
E- 6	PN1,	PN1,		
E- 5	PN2,			
E- 4	PN3,			
E- 3	PNSN,	AN,	SN,	
E- 2	AA,	SA,		
GS- 6	204,			
GS- 3	322,			
GS- 2	204C,			

1F RESALE AND SPECIAL SERVICES

WHITING

LABOR TYPE AND GRADE							
E- 8	OMCS,	MMCS,					
E- 7	MMC,	BMC,					
E- 6	BT1,	SM1,	EN1,	MM1,			
E- 5	MM2,	EM2,	BT2,	EM2,	AM2,	BM2,	
E- 4	AMS3,	ABE3,	GM3,				
E- 3	EN,	AN,	SA,	AMSAN,			
E- 2	AA,	ADRAA,					
GS-11	188,						
GS- 7	188,	3C1,					
GS- 4	5C1,	1411,					
GS- 3	3C1,						
WG- 8	5301S,						
WG- 6	A9CC4,						
WG- 4	67CC5,						

1J ADMINISTRATIVE OFFICE SUPPLIES

WHITING

LABOR TYPE AND GRADE			
GS- 9	301,		
GS- 7	344,		
GS- 6	3C4,	6C5,	
GS- 4	3CF,		
GS- 3	3C1,	322,	
GS- 2	3C2,		
GS- 1	3FC,		

2B INVENTORY CONTROL

WHITING

LABOR TYPE AND GRADE	
E- 4	AK1,
E- 3	AA,
GS- 6	205C,
GS- 3	204C,
GS- 2	322,

2C PURCHASE

WHITING

LABOR TYPE AND GRADE
GS- 4 2024,

2D MATERIAL CONTROL

WHITING

LABOR TYPE AND GRADE
E- 7 AK0,
E- 6 AK1,
E- 5 AK2,
E- 4 SK3, AK3,
E- 3 AN,
WG- 6 4900C7,
WG- 5 4500C7,
WG- 1 3500C6,

2G FUEL OPERATIONS

WHITING

LABOR TYPE AND GRADE
E- 8 MMCS,
E- 6 MM2, ABE2,
E- 4 ABE3,
E- 3 ARFAN, AN,
WG-10 4900C4,
WG- 5 4400C4,

2H RETAIL OPERATIONS

WHITING

LABOR TYPE AND GRADE
E- 4 SK3,

2M HOUSEHOLD GOODS

WHITING

LABOR TYPE AND GRADE
GS- 5 2134,

2N FOOD SERVICE

WHITING

LABOR TYPE AND GRADE
LT 1105,
WG- 3 3701,
E- 9 SDCM,
E- 7 AMHC, RTC, SDC, CSC,
E- 6 CS1, RT1, SD1, SK1,
E- 5 CS2, SD2,
E- 4 CS3, SD3,
E- 3 AN, TN, CSSN,
E- 2 AA, TA, CSSA,
GS-10 1101,
GS- 4 2254,
WG- 7 7400C4,
WG- 2 7400C8,
WG- 1 7600C4,

4A MEDICAL FACILITY

WHITING

LABOR TYPE AND GRADE
CDR 2100,
LCDR 2102, 2900,
LT 8172, 2109,
E- 9 HMCS,
E- 7 HMC,
E- 6 HM1,
E- 5 HM2,
E- 4 HM3,
E- 3 HN,

4D DENTAL FACILITY

WHITING

LABOR TYPE AND GRADE
CDR 2200,
LCDR 2202,
LT 2201,
E- 6 DT1,
E- 5 DT2,
E- 4 DT3,
E- 3 DN,
GS- 5 4431,
GS- 2 3401,

6A COMMUNICATIONS

WHITING

LABOR TYPE AND GRADE
LT 1325,
E- 7 RMC,
E- 6 SK1, RM1, YN1, RM1,
E- 5 QM2, MM2, RM2,
E- 3 AN, SN, RMSN, CYNSN,
E- 2 AA,

6C AIR OPERATIONS

WHITING

LABOR TYPE AND GRADE												
CDR	1317,											
LT	1255,											
WG- 4	64C2,											
WG- 6	ETCM,											
WG- 8	ARCS,	ADCS,										
WG- 7	ACC,											
WG- 6	AC1,	ET1,	GMG1,	PH1,								
WG- 5	AC2,	ETN2,	GMG2,	PH2,	ARH2,							
WG- 4	AC3,	ETN3,	ETR3,	PH3,	ARH3,							
WG- 3	ACAN,	AN,	PHAN,									
WG- 2	ACAA,	AA,										
GS- 9	864,											
GS- 4	318,											
GS- 2	322,											
WG-11	24C14,											

6J TRAINING, GENERAL

WHITING

LABOR TYPE AND GRADE				
CDR	131C,			
LCDR	1325,			
LT	131C,	7412,	1320,	1325,
LTJG	132F,	1355,	137C,	
WG- 8	TDCS,			
WG- 7	TDC,			
WG- 6	QM1,	TD1,		
WG- 5	TD2,			
WG- 4	TD3,			
WG- 3	AN,	TDAN,		
GS-11	171C,			
GS- 9	1712,	1416,		
GS- 7	1712,			
GS- 6	342,			
GS- 4	2040,			
GS- 3	322,	2040,	3C1,	

6F OPERATIONS OF AIRCRAFT

WHITING

LABOR TYPE AND GRADE

AA AIRCRAFT MAINTENANCE DEPARTMENT

WHITI

LABOR TYPE AND GRADE													
CDR	131C,												
LCDR	6852,												
LT	68C2,	1355,											
LTJG	7412,												
WG- 4	6852,												
WG- 9	AECM,	AVCM,											
WG- 8	AMCS,	ADCS,											
WG- 7	ADPC,	AMSC,	AKC,	AMHC,	AEC,	ATC,	PRC,						
WG- 6	AT1,	AMH1,	ASI,	AZ1,	ADR1,	AMS1,	AK1,	MR1,	AE1,	PR1,			
WG- 5	ASE2,	ASM2,	AF2,	AK2,	ADR2,	AMS2,	AMH2,	AE2,	ATN2,	PR2,			
WG- 4	ASM3,	AK3,	AZ3,	ADR3,	AMH3,	AMS3,	MR3,	AE3,	ATN3,	PR3,			
WG- 3	ADPAN,	AN,	AMAN,	AMSAN,	AEAN,	ATNAN,	PRAN,						
WG- 2	AA,	ADRAA,	AMHAA,	AMSAA,									
GS- 7	1157,												
GS- 4	312,	305,											
GS- 3	322,	620,	2040,										
GS- 4	355,	302,	2040,										
WG- 7	37C2,												
WG- 5	69CC7,												
WG- 1	35066,												

SB30 VT2

WHITING

LABOR TYPE AND GRADE	
LCDR	1331,UNKWN, 137C,
LT	1331,
LTJG	137C, 1331,
GS- 7	ADRC, ATC,
GS- 6	AT1,
GS- 5	AMS2,
GS- 4	ADR2,
GS- 3	AN, SN,
GS- 2	AA,
GS- 8	3C1,
GS- 4	3C1,
GS- 3	322, 2C4,
WG- 1	38C44,
GM- 1	1331,

SB40 VT2

WHITING

LABOR TYPE AND GRADE	
LCDR	136C, 685C, 741C,
LT	1331, 137C,
ENS	741C, 1360,
WG- 4	1360,
WG- 2	76CC,
WG- 1	1331, 137C,
GS- 9	AFCM,
GS- 8	ADCS, AMSC, SKCS, AMCS,
GS- 7	AZC, ADRC, ATC, AEC, AMSC,
GS- 6	AMS1, AT1, AMH1, AE1, ADR1, AK1, AME1, ADP2, AT1, AS1,
GS- 5	AT2, ATN2, ADR2, AK2, AMH2, AMS2, AHM2, AME2, AM13, PR2, AF2, ASM2,
GS- 4	AZ3, AMS3, AMH3, PR3, ADR3, AME3, AF3, ATN3, ASM1,
GS- 3	ADRAN, AEAN, AN, AZAN, AMSAN, AMHAN, PRAN, ATNAN, ASMAN,
GS- 2	AA, ADRAA, AMSAA, AMHAA,
GS- 5	322,
GS- 2	3C1,
WG- 2	35CC2,
WG- 1	35C66,
GM- 1	1331,

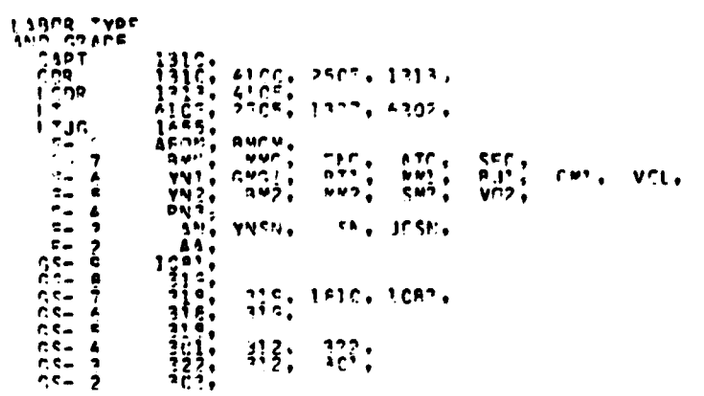
SC40 VT3

WHITING

LABOR TYPE AND GRADE	
LCDR	685C, 136C, 133I, 6P0C,
LT	136C, 133I, 741C,
GS- 9	AFCM,
GS- 7	AZC, AZ2, ADRC, AMHC, AMEC, AEC, ATC, AKC,
GS- 6	AT1, ADR1, AK1, AMH1, AE1, AMS1,
GS- 5	AT2, ADR2, AK2, AK2, SK2,
GS- 4	AK3, ADR3, AT3, AK3, AMH3, SMS3,
GS- 3	AN, AMHAN, AMSAN, SN, ADRAN,
GS- 2	AA, AMSAA,
GS- 4	312, 32C,
GS- 3	322,
GS- 2	3C1,
WG- 6	A3CC4,
WG- 2	35CC2,

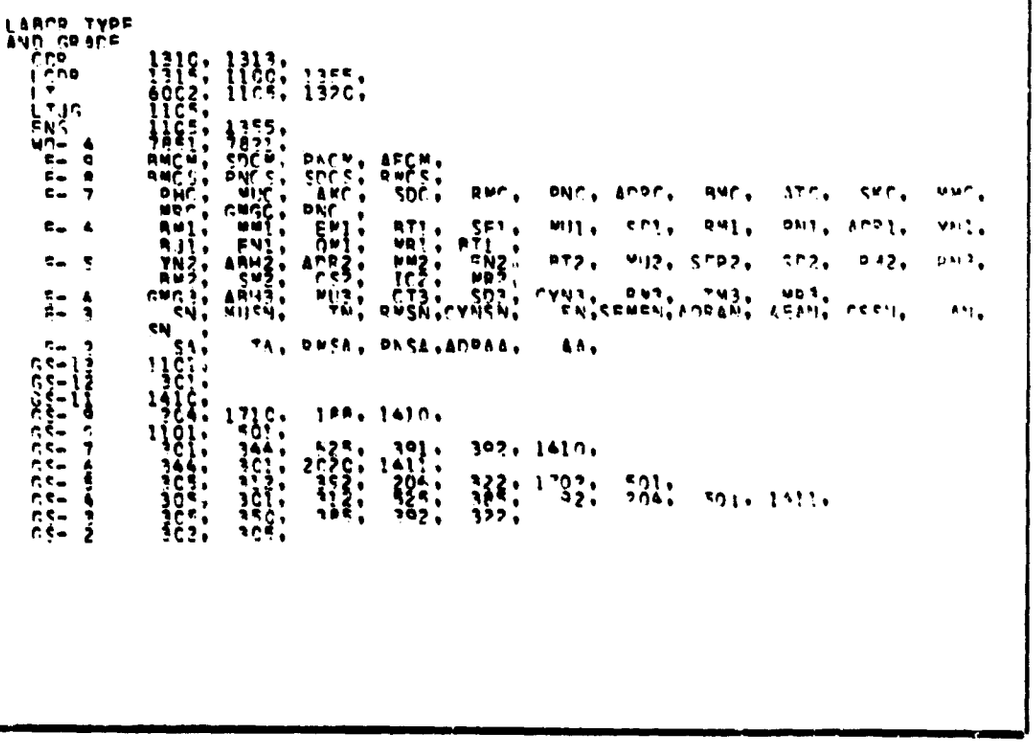
A COMMAND

SHERMAN



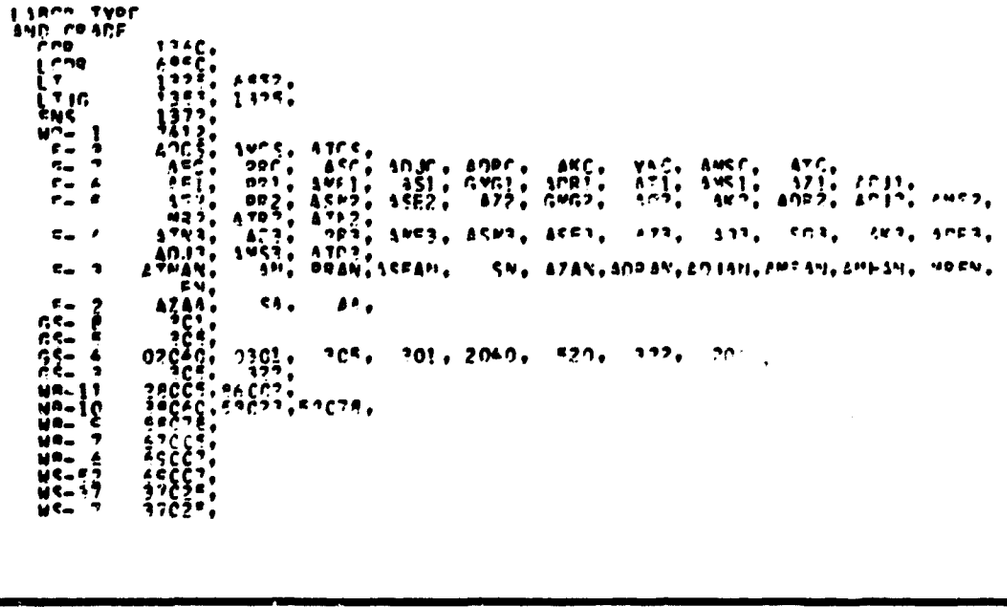
B ADMINISTRATION

SHERMAN



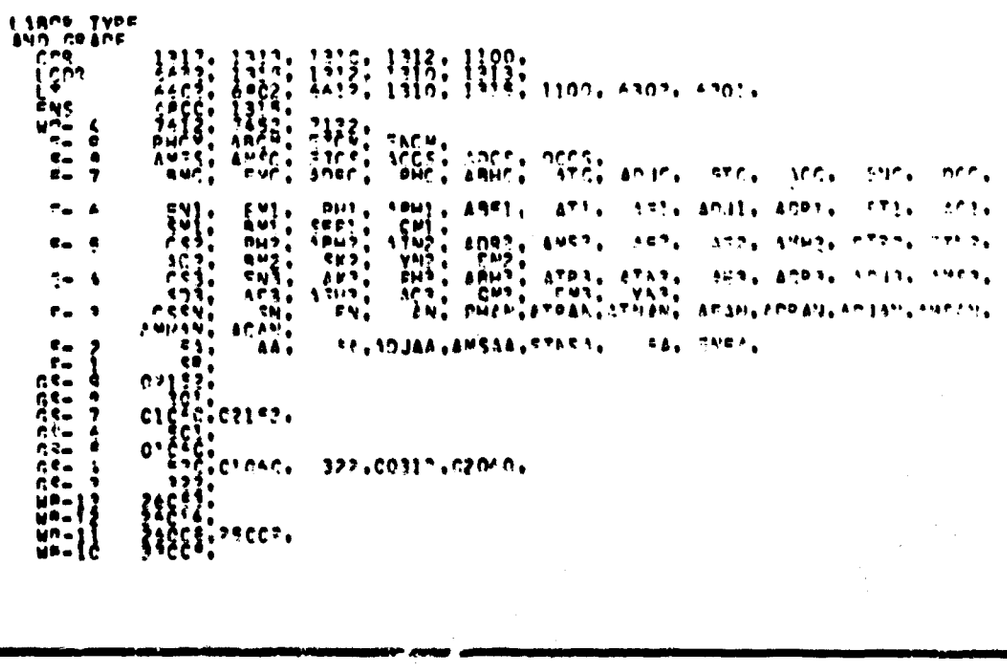
C AIRCRAFT MAINTENANCE

SHERMAN



D AIR OPERATIONS

SHERMAN



E COMPTROLLER

SHERMAN

LABOR TYPE AND GRADE									
FOR	31CC.								
LEAD	31CC.								
I*	31CC.								
LVIG	31CC.								
WG- 4	7C91.								
WG- 3	0KC.								
WG- 4	0K1.								
WG- 5	0K2.								
WG- 4	0K1.								
WG- 3	0K2.	4N.							
WG- 2	4A.								
GS-13	4CC.								
GS-12	31CC.								
GS-11	31CC.	540.							
GS- 9	3441.	46C.	52F.	510.	501.				
GS- 8	424.	444.							
GS- 7	424.	544.	54F.						
GS- 6	314.	52F.	501.	544.	54F.	540.	313.		
GS- 5	540.	33K.	501.	203.	54F.	540.			
GS- 4	312.	42F.	501.	520.	327.	444.	203.	54F.	54?.
GS- 3	322.	301.	5[illegible].						

F DATA PROCESSING

SHERMAN

LABOR TYPE AND GRADE					
FOR	31CC.				
WG- 7	0DC.				
WG- 6	0D1.				
WG- 5	0D2.				
WG- 4	0D3.				
GS-14	33C.				
GS-13	334.				
GS-12	341.	334.	332.		
GS-11	444.	534.	532.		
GS- 9	334.	332.			
GS- 7	332.	534.	54C.		
GS- 6	318.				
GS- 5	332.	334.	32C.	33A.	
GS- 4	333.	33C.	32C.	35A.	
GS- 3	321.	32C.	324.		
GS- 2	32C.	324.			
WG- 6	60CC.				

G DENTAL FACILITY

SHERMAN

LABOR TYPE AND GRADE		
FOR	33CC.	
LEAD	33CC.	
I*	33CC.	
LVIG	33CC.	33C?.
WG- 8	0YCC.	
WG- 6	0YC.	
WG- 5	0Y1.	
WG- 4	0Y2.	
WG- 3	0Y3.	
GS- 6	433.	
GS- 5	3C1.	

H INDUSTRIAL RELATIONS

SHERMAN

LABOR TYPE AND GRADE					
GS-13	3C1.				
GS-12	3C1.	3C1.	331.	312.	
GS-11	33C.	33C.	331.		
GS- 9	33C.	33C.	331.	312.	
GS- 7	312.	3C1.	32C.	32C.	312.
GS- 6	312.	3C1.	32C.	304.	
GS- 5	31C.	32C.	304.		
GS- 4	312.	32C.	32C.	30C.	30C.
GS- 3	32C.	304.			
GS- 2	304.				

K MEDICAL SERVICES

SHERMAN

LABOR TYPE AND GRADE		
FOR	31CC.	
LEAD	31CC.	
I*	31CC.	
LVIG	31CC.	31C?.
WG- 8	0MCC.	
WG- 7	0MC.	
WG- 6	0M1.	
WG- 5	0M2.	
WG- 4	0M3.	
WG- 3	0M4.	
GS-13	4CC.	
GS-12	31CC.	
GS-11	31CC.	
GS- 9	31CC.	
GS- 7	31CC.	
GS- 5	31CC.	
GS- 3	31CC.	

N SUPPLY

SHERMAN

LABOR TYPE AND GRADE	
CLERK	3100,
CRO	3100,
LCO3	3100, 3702,
LT	3102, 3702,
E-10	3105,
WO-5	7260,
E-9	9999,
E-8	SK0, SK0,
E-7	SK1, SK1,
E-6	SK2, SK2,
E-5	SK3, SK3, SK3,
E-4	SK3N, SK3N, SK, YASK,
E-3	AS, SA,
GS-13	2003,
GS-12	2003, 1102, 1104,
GS-11	2130, 2003, 1102, 0560, 1104, 2030, 2010,
GS-9	2003, 2130, 1102, 357, 1104, 2010,
GS-8	2040,
GS-7	2040, 1102, 0560, 1104, 2010, 2050,
GS-6	2040, 2050, 2135, 318, 2135, 501,
GS-5	2040, 2135, 318, 2020, 501, 350, 1104, 2010, 2135,
GS-4	2040, 318, 2020, 322, 305, 335, 501,
GS-3	322, 501, 2040, 301, 520, 350, 305,
GS-2	322, 320, 301, 322,
WB-10	44CC7,
WB-5	44C21,
WB-4	44CC7, 72002,
WB-3	44CC7, 57CC4, A3C12,
WB-2	35CC7,
WG-12	44C21,
WG-11	44CC7, 47CC7,
WG-10	44C12,
WG-7	44CC7,
WG-7C	44C21,
WG-6	44CC7,
WG-5	44CC7,

OF SUPPLY - FUEL

SHERMAN

LABOR TYPE AND GRADE	
E-7	VT0,
E-6	SK1, VK1,
E-5	VT32,
E-3	SA,
GS-8	2003,
GS-6	2040,
GS-5	2040,
WB-10	44CC7,
WG-5A	44C21,

OH SUPPLY - HOUSEHOLD GOODS

SHERMAN

LABOR TYPE AND GRADE	
E-8	SKC0,
E-7	SK0,
E-3	SA,
E-3	SK3A, SA,
GS-8	2130,
GS-7	2130,
GS-6	2130,
GS-5	2130,
GS-3	322,

OM SUPPLY - MESSES

SHERMAN

LABOR TYPE AND GRADE	
LCO3	3702,
E-8	0505,
E-7	050,
E-6	SK1, SK1,
E-5	SK3, SK3, SK3,
E-4	SK3, SK3,
E-3	SK3N, SA, SA,
E-2	SA, SA, 0504,
WB-1	74CC7,

Q TRAINING, GENERAL

SHERMAN

LABOR TYPE AND GRADE	
LCO3	1310,
LT	1310,
E-8	9999,
E-7	990,
E-6	991,
E-5	993,
E-4	993,
E-3	SA, 9999,
GS-9	1310,
GS-7	1310, 301,
GS-6	2010, 2010, 301,
GS-5	2010, 305, 322,
GS-3	2010, 322, 301,
WG-11	1310, 2010,
WG-10	1301,
WG-10	1301,

R **NAVAL AVIATION SCHOOLS COMMAND**

SHERMAN

LABOR TYPE AND GRADE	
CAPT	1310,
CDR	1310, 1370,
LCDR	4100, 1310, 1322, 1315, 1300, 1325, 1350,
LT	1370, 1315, 1105, 4900, 1310, 1325, 1300,
LTJG	1355, 1105,
E- 8	ADCS, AMCS,
E- 7	CMC , CMC ,
E- 6	YN1 , PR1 , SH1 , TC1 ,
E- 5	SD2 , SH2 , SM2 , YP2 ,
E- 4	SK3 ,
E- 3	ADR3N, SN , PRAN, AN ,
E- 2	SR , PR3N,
GS- 6	301 , 1302, 1710,
GS- 7	344 ,
GS- 8	1081,
GS- 5	204 , 318 , 1102,
GS- 4	501 , 1[illegible] , [illegible] , 1021, 204 , 322 ,
GS- 3	322 , 3040, [illegible] ,
GS- 1	350 , 1710,
WG- 5	4704G,
WG- 2	3500?,
WG- 1	3504?,

SD00 **VT4 SQUADRON**

SHERMAN

LABOR TYPE AND GRADE	
LCDR	1370, 1321, 1360, 4900, 2100,
LT	1321, 1370, 4950,
LTJG	1321,
E- 8	AFCM,
E- 7	AMCS, AMCS, ADCS, ATCS,
	YNC , PNC , SKC , QMC , ATC , AMHC, AZC , AKC , AMSC, ADJC, AEC , ADC , ARHC,
E- 6	YN1 , PN1 , PR1 , AZ1 , AT1 , ADJ1, AMS1, AK1 , AMH1, AE1 , AME1,
	PR1 , AD1 , AQ1 ,
E- 5	YN2 , PN2 , MM2 , AZ2 , AK2 , ADJ2, AMH2, AMS2, PR2 , AME2, ATN2,
	ATR2, AE2 , AC2 , ACE2,
E- 4	YN3 , PN3 , AZ3 , AC3 , ADJ3, PR3 , AMS3, AMH3, AME3, ATN3, ATR3,
	AE3 , AQ3 , ADR3,
E- 3	YNSN, PRSN, PASN, AZAN, AN ,ADJAN, PRAN,AMSAN,AMHAN,AMEAN,ATNAN,
	AESN, ADJAN,ADRAN,
E- 2	AA ,

SF00 **VT6 SQUADRON**

SHERMAN

LABOR TYPE AND GRADE	
LCDR	1311, 1370, 1360, 4950, 1331,
LT	1331,
LTJG	1331,
E- 8	ADCS,
E- 7	YNC , ADRC, AMSC, ATC ,
E- 6	PR1 , PN1 , YN1 , ADR1, AMH1, AQ1 , AE1 , AMS1, PR1 , AT1 , AK1 ,
E- 5	MM2 , YN2 , SK2 , AZ2 , ADR2, AMS2, AMH2, AME2, ATN2, AC2 , AK2 ,
E- 4	PN3 , YN3 , AZ3 , ADR3, AMS3, AMH3, ATN3, AE3 , PR3 ,
E- 3	YNSN,AMSAN, PRAN,AMSAN,ATNAN, AEAN, AN ,

KB00 VT10 SQUADRON

SHERMAN

LABOR TYPE AND GRADE	
LCDR	1331, 1370, 1331, 4800,
LT	1370, 1331, 1340,
LTJG	1310, 1370,
E- 8	ADRC, AMSC,
E- 7	ENC , YNC , SEC , ATC , AEC , ADRC, ADR1,
E- 6	BM1 , BM1 , AZ1 , AK1 , AD.I1, AT1 , AF1 , AMH1, ATI1 , AMS1, AME1, ADR1,
E- 5	YN2 , ??? , AK2 , AD.I2, ADR2, AE2 , ATA2, AMS2, AMH2, AME2, ??? ,
E- 4	YN? , PN3 , TR3 , AK3 , ATN?, AE3 , AD??, AD.I?, AMS3, AMH3, AME?, PR3 ,
E- 3	SN , PNSN, AA , ATRAN, AEAN,
E- 2	SA , AA ,

S AVIATION OFFICERS CANDIDATE SCHOOL (AOCS)

SHERMAN

LABOR TYPE AND GRADE	
CAPT	1310,
CDR	6613,
LCDR	1310, 1370, 1300, 1325, 1320, 9912,
LT	1320, 1300, 1325, 1370, 1327, 9912,
LTJG	1325, 1300, 9912, 1105,
E- 7	GSGT, SSGT, SGT ,
E- 6	QM2 , YN2 , BM2 ,
E- 3	PRAN,
GS- 9	1712, 1710,
GS- 5	318 ,
GS- 3	322 ,
GS- 2	322 ,

T FLIGHT SYSTEMS (FS)

SHERMAN

LABOR TYPE AND GRADE	
CDR	1370,
LCDR	1320, 9912, 2300, 2305, 6602, 1300,
LT	1300, 1320, 1325, 1310, 2300, 4852, ADRC,
LTJG	9912, 1320, 1325,
E- 7	ADRC,
E- 6	YN1 , ADR1,
E- 5	ADR2,
E- 3	SN , ADRAN,
GS- 9	1710,

J AVIATION OFFICERS INDOCTRINATION

SHERMAN

LABOR TYPE AND GRADE	
LCDR	1310,
LT	1325, 1300, ADC2,

V SURVIVAL TRAINING

SHERMAN

LABOR TYPE AND GRADE

CAPT	9912,
CDR	1310,
LCDR	1325, 9912, 1312, 1315,
LT	1300, 1310, 1325, 1320, 1370, 1327, 7402,
LTJG	1325, 7402,
[illegible]	MMC , ADBC , PRC , RMC ,
[illegible]	EN1 , PR1 , SK1 , CM1 , RT1 , HM1 , PN1 , AO1 ,
[illegible]	BR2 , RD2 , RT2 , AO2 , HM2 ,
[illegible]	PR3 ,
[illegible]	PRAN,
OS-11	1710,
[illegible]	1710,
[illegible]	4700,

0062 CNABATRA STAFF

SHERMAN

LABOR TYPE AND GRADE

VADM	1310,

6200 CNABATRA STAFF

SHERMAN

LABOR TYPE AND GRADE

VADM	1300,
CAPT	1300, 1100,
CDR	1300, 2500, 1100, 3100,
LCDR	1300, 4800,
LT	2500, 1300, 4202, 3100,
LTJG	1300,
ENS	1100,
[illegible]	PNCM, AECM,
[illegible]	VAC , PRC , ADEC , RTC , ADC , ADJC , AKC , YNC ,
[illegible]	YN1 , PR1 , MM1 , EN1 , SK1 , AS1 , AK1 ,
[illegible]	SD2 , YN2 , PR2 , RT2 , SK2 ,
[illegible]	SD3 , YN3 , AT3 ,
[illegible]	SN , JOSN , DMSN , YASN , AKAN ,
OS-14	1710,
OS-13	801,
OS-12	1?0 , 345 , 901 , 343 , 334 , 501 ,
OS-11	304, 1710, 342,
OS-10	301,
OS-9	345 , 343 , 901C , 364 ,
OS-7	313 , 344 , 301 , 345 , 560 ,
OS-6	313 , 304 , 501 ,
OS-5	313 , 304 , 301 ,
OS-4	304 , 304 , 312 ,
OS-3	333 ,

1111 FLIGHT DEMONSTRATION TEAM

SHERMAN

LABOR TYPE AND GRADE												
CDR	131C,											
LCDR	131C,											
LT	131C,	USMC,	132C,	1100,								
E- 7	ADJC,	AMHC,										
E- 6	ADJ1,	PAT1,	AE1,	AMH1,	AME1,	AO1,	PR1,					
E-	YN2,	VO2,	ADJ2,	AT2,	AE2,	AMS2,	AMH2,	AME2,	AO2,	PR2,	AK2,	
	AT2,											
E- 4	ADJ3,	AME3,										
E- 3	ADJAN,	AN,	PRAN,	ATAN,	AMEAN,	ATAN,						
E- 2	ADJAA,	AA,										

KD00 AVIATION MUSEUM

SHERMAN

LABOR TYPE AND GRADE		
E- 6	AO1,	
E- 3	OMSN,	SN,
WB-14	AAC14,	

N SECURITY

SHERMAN

LABOR TYPE AND GRADE								
LCDR	1317,							
E- 9	BMCM,							
E- 8	BMC8,	BTC8,						
E- 7	BMC,	BTC,	CMC,	MMC,				
E- 6	QM1,	MM1,	BT1,	BM1,	ADR1,	DC1,	ABH1,	
E- 5	BM2,	GM2,	MA2,	AGH2,	GMG2,			
E- 4	ABE3,	TM3,						
E- 3	YNSN,							
E- 2	SA,							
GS-11	CR1,							
GS- 9	CR2,							
GS- 8	CR3,	CR1,						
GS- 7	CR3,	CR1,						
GS- 6	3C1,	CR1,						
GS- 5	CR3,	318,	CR1,					
GS- 4	322,	CR3,	CR1,					
GS- 3	322,	CR5,	CR1,					

J MANAGEMENT ASSISTANCE

SHERMAN

LABOR TYPE AND GRADE				
GS-13	BC2,	343,		
GS-12	343,			
GS-11	BC2,	343,		
GS- 9	BC1,	2150,	BC2,	
GS- 7	BC2,	2150,	343,	
GS- 5	318,			
GS- 4	322,	301,		
GS- 3	322,			
GS- 2	322,			

A COMMAND & STAFF

MERIDIAN

LABOR TYPE AND GRADE											
CDR	41CC,										
LCDR	132C,	41CC,									
LT	41CC,	132C,	162C,								
LTJG	31CC,	31CC,	132C,								
E- 6	0K1,	V01,									
E- 5	0K2,	V02,	YA2,								
E- 4	0K3,										
E- 3	SN,	V03N,	YA3N,								
GS-11	C10,										
GS-10	2C1,										
GS- 9	6C2,										
GS- 7	2C2,										
GS- 5	53C,	2132,	546,								
GS- 4	2C3,	2132,	546,	312,	323,						
GS- 3	322,	312,									

B ADMINISTRATION

MERIDIAN

LABOR TYPE AND GRADE											
CDR	1366,										
LCDR	131C,	132C,									
LT	131E,										
LTJG	11CC,										
ENS	1355,										
E- 9	AECM,										
E- 8	CSCS,	CMCS,									
E- 7	PNC,	RTC,	RMC,	SOC,							
E- 6	YN1,	PN1,	GMG1,	RT1,	MM1,	EM1,	SK1,				
E- 5	RM2,	PC2,	PR2,	MM2,	RT2,	SH2,	EW2,	SO2,			
E- 4	EN3,	YN3,	PN3,	EN3,	OC3,	EM3,	GYN3,	SO3,			
E- 3	PCSN,	SN,	PRSN,	YNSN,	AN,	RMSN,	GYNSN,	FN,			
E- 2	SA,	PNSA,	AA,	FA,							
GS- 7	346,										
GS- 6	3C1,	5C1,	344,	1411,	525,	382,					
GS- 4	312,	384,									
GS- 3	35C,	322,	382,	354,							
GS- 2	3C2,	20C5,	322,								

C AIRCRAFT MAINTENANCE

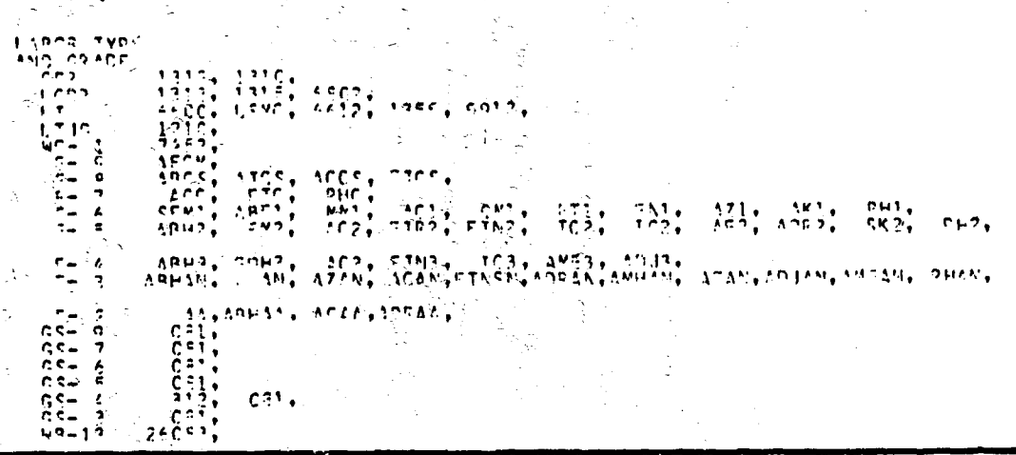
MERIDIAN

LABOR TYPE AND GRADE											
CDR	1313,										
LCDR	135C,										
LT	6662,	66C2,	135C,								
ENS	1366,										
WO- 4	7611,										
WO- 3	741C,										
WO- 1	7412,										
E- 8	AOCS,	ATCS,									
E- 7	MRC,	ATC,	AMSC,	AOJC,	AMHC,	AEC,					
E- 6	AMS1,	AME1,	AE1,	AK1,	AT1,	AOJ1,	AS1,	MM1,	AMH1,	AT1,	PR1,
E- 5	AOJ2,	AT2,	AK2,	AOR2,	YN2,	AOT2,	AS22,	AME2,	LAOJ2,	AMH2,	AMS2,
	MR2,	AE2,	ATN2,	EM2,	PR2,	ASH2,					
E- 4	AT3,	AOJ3,	YN3,	ASM3,	AME3,	AMS3,	AMH3,	ATN3,	PR3,		
E- 3	AKAN,	AOJAN,	PN,	ATAN,	ASHAN,	ASMAN,	ASEAN,	AMHAN,	AMSAN,	ATNAN,	PRAN,
	EMEN,	PRAN,									
E- 2	AA,	AEAA,	1366,	PRAA,							

NOT REPRODUCIBLE

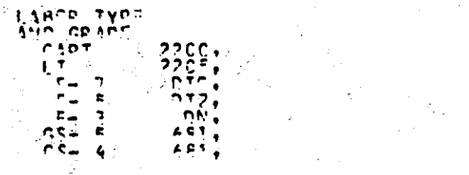
AIR OPERATIONS

MERIDIAN



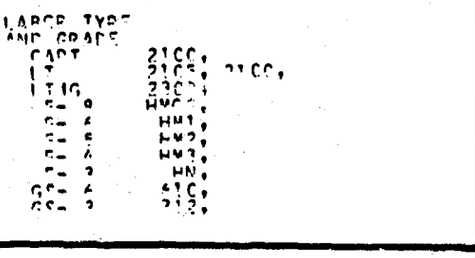
E DENTAL SERVICES

MERIDIAN



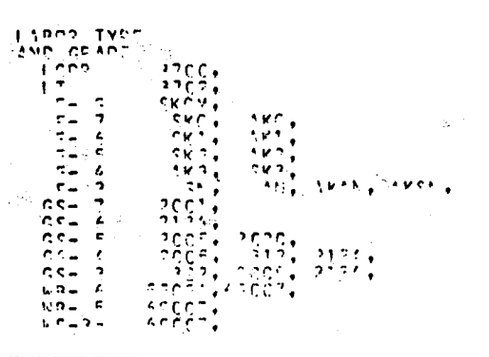
F MEDICAL SERVICES

MERIDIAN



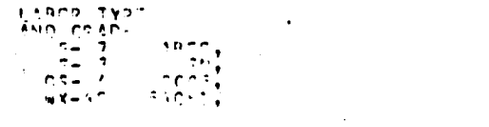
G SUPPLY - GENERAL

MERIDIAN



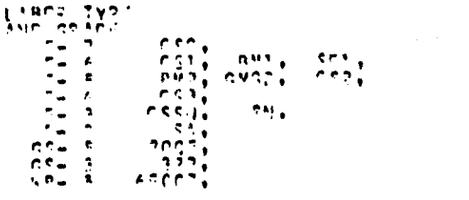
HF SUPPLY - FUEL OPERATIONS

MERIDIAN



HM SUPPLY - FOOD SERVICES

MERIDIAN



HH SUPPLY - HOUSEHOLD GOODS

MERIDIAN

J TRAINING

MERIDIAN

LABOR TYPE AND GRADE	
FDR	131C,
LCDR	131C, USMC,
LT	6852, 131C, 132C, 1350, 1325, 1105, USMC,
LTJG	110E, USMC,
E- 8	TDCS,
E- 7	TDC,
E- 6	TD1,
E- 5	TD2,
E- 4	TD3,
E- 3	TDAN, AN,
E- 2	TDAA,
GS-11	171C,
GS- 3	322,

SG00 VT7 SQUADRON

MERIDIAN

LABOR TYPE AND GRADE	
LCDR	137C, 1321, 6850, 1360, 6800, 2100,
LT	1321, 137C, 136C,
LTJG	1321,
E- 9	AFCM,
E- 8	ENCS, ATCS,
E- 7	YNC , AZC , AFC , ADJC , AMHC , AMSC , AMEC , AKC , ATC ,
E- 6	BT1 , PN1 , MM1 , BM1 , YN1 , AZ1 , ADJ1, AMH1, AMS1, AME1, PR1 , AE1 , AT1 , AK1 , ABJ1,
E- 5	YN2 , PN2 , BM2 , MM2 , SH2 , SM2 , EN2 , SEM2, AZ2 , AE2 , ADJ2, AMH2, AMS2, AME2, PR2 , AK2 , ATN2, ABH2,
E- 4	AK3 , AKO , YN3 , PN3 , AZ3 , AE3 , ADJ3, AMH3, AMS3, AME3, PR3 , ATN3,
E- 3	AKAN, YNSN, SN , PNSN, AZAN, AN , AEAN, PRAN, ATNAN, ADJAN, AMSAN, AMHAN, AMEAN,
E- 2	ADJA, AMHA, AMSA, AMEA, AA ,

SJ00 VT9 SQUADRON

MERIDIAN

LABOR TYPE AND GRADE	
AFM	741C,
FDR	1321,
LCDR	137C, 1321, 6852, 6800, 136C,
LT	1321, 2100, 137C, 136C,
LTJG	1321,
E- 9	AFCM,
E- 8	ENCS, ATCS, AMCS, ADCS,
E- 7	YNC , EMC , AMSC, ADJC, AZC , AEC , AMHC, AMEC, PRC , AKC , ATC ,
E- 6	BT1 , PN1 , BM1 , YN1 , AZ1 , AE1 , AMH1, AMS1, ADJ1, AME1, PR1 , AMM1, AT1 , AK1 , ABH1, AJO1,
E- 5	YN2 , PN2 , BM2 , MM2 , SH2 , SM2 , EN2 , SEM2, EMC2, AZ2 , AE2 , AMH2, AMS2, ADJ2, AME2, PR2 , ATN2, AK2 , ATO2, ABH2,
E- 4	YN3 , PN3 , BT3 , AE3 , AMH3, AMS3, ADJ3, AME3, PR3 , AK3 , ATO3, ATN3, ABH3,
E- 3	YNSN, SN , PNSN, AZAN, AN , ADJAN, AMHAN, AMSAN, AMSAN, PRAN, AMAN, ATNAN, AEAN,
E- 2	AA ,
E-1C	ADJ1,

I SECURITY

MERIDIAN

LABOR TYPE AND GRADE								
LCOR	LSMC,							
	EMCM,							
	ARHC,							
	MM1,	RM1,	RT1,	GMG1,	OC1,	EM1,	SF1,	
	RM2,							
	SRM3,							
	AN,							
	C83,							
	C84,							
	322,	C85,	C83,					
	C85,							

K PUBLIC WORKS

MERIDIAN

LABOR TYPE AND GRADE	
L*	51CC,
ENS	81C5,
WCP 4	84E1,
7	EDC,
6	EOH1,
5	EOH2,
4	EOH3,
3	OMSN,EOHCN,
2	AS,
12	EC1,
11	93C, 321,
9	11C2,
8	1173,
7	9CC,
6	EC1, 1173, 818, 2C20,
5	442, 312, 322,
4	322, 312,
12	24CC3,
11	21CC4,25005,53CC4,53015,37003,52004,
10	25CC7,41CC2,E3C33,
9	E3C35,57C14,54CC4,
8	55CC1,
7	E4C18,57C35,
6	57C34,57C14,
5	28CC5,35042,47C45,5RC0A,
4	38CC3,
3	38C64,
2	47C42,
1	47C4C, 4??E,
12	47C4C,
11	38CC3,
10	57C14,
9	38C64,
8	38C14,
7	47C42,
6	28CC4,
5	47C43,
4	47C42,
3	28CC5,
2	55CC3,
1	38C61,
12	5CC14,

A. SHORE ACTIVITIES

→ 1. Chief of Naval Air Training
→ 2. Chief of Naval Air Basic Training
* 3. Naval Aerospace Medical Center
* 4. Naval Hospital
* 5. Naval Aerospace Medical Institute
→ 6. Naval Air Station, Pensacola
→ 7. Naval Aviation Schools Command
8. Naval Auxiliary Air Station, Meridian
9. Naval Auxiliary Air Station, Whiting
10. Naval Auxiliary Air Station, Saufley
11. Naval Auxiliary Air Station, Ellyson
12. Naval Weather Service Environmental Det., NAAS Saufley
*13. Naval Weather Facility, Pensacola
→ 14. Naval Aviation Museum
→ 15. Marine Aviation Detachment
*16. Public Works Center, Pensacola
*17. Naval Air Technical Training Unit
18. Naval Communications Training Center
19. Naval Weather Service Environmental Det., Memphis, Tennessee
20. Naval Weather Service Environmental Det., New Orleans, Louisiana
21. Naval Weather Service Environmental Det., Dallas, Texas
*22. Naval Air Systems Command Representative, NATRACOM
23. Naval Reserve Training Center, Ellyson
*24. Navy Publications and Printing Service Office, NATRACOM
*25. Naval Air Rework Facility, Pensacola
*26. Naval Training Device Center, Regional Office, Central
*27. Naval Investigative Service Resident Agency
*28. Naval Air Training Division, Naval Facilities Engineering Com., Pensacola
*29. Naval Audit Office
*30. Commissary Store, Pensacola
31. Commissary Store, Meridian
32. Supervisor of Shipbuilding, Conversion and Repair, Pascagoula, Miss.
33. Naval and Marine Corps Reserve Training Center, Mobile, Alabama
34. Naval Reserve Training Facility, Laurel, Miss.
35. Naval Reserve Training Facility, Hattiesburg, Miss.
36. Naval and Marine Corps Reserve Training Center, Jackson, Miss.
37. Naval Reserve Training Facility, Vicksburg, Miss.
38. Naval Reserve Training Facility, Natchez, Mississippi
39. Naval and Marine Corps Reserve Training Center, Montgomery, Alabama
40. Naval Reserve Training Facility, Troy, Alabama
41. Construction Battalion Center, Gulfport, Miss.

Figure 5-1. Definition of Activities and Units Providing and Receiving Support

Figure 5-1 (Cont'd)

42. Construction Training Unit, Gulfport, Miss.
43. Naval Weather Service Environmental Det., Chase Field, Texas
44. Naval Weather Service Environmental Det., Corpus Christi, Texas
45. Naval Weather Service Environmental Det., Kingsville, Texas
46. Naval and Marine Corps Reserve Training Center, Gulfport, Miss.
47. Naval Reserve Officers Training Corps Unit, Auburn, Alabama
48. Navy Mine Defense Laboratory, Panama City, Florida
49. Naval Air Mine Defense Development Unit, Panama City, Florida
50. Naval Recruiting Center, Birmingham, Alabama
51. U.S. Coast Guard Search and Rescue Unit, Biloxi, Mississippi
52. Naval Air Systems Command Representative, Dothan, Alabama
53. Naval Weather Service Environmental Det., NAAS Meridian
56. Naval Weather Service Environmental Det., NAAS Whiting
57. U.S. Army Reserve Training Center
* 58. National Cemetery
59. Naval Weather Service Environmental Det., NAAS Ellyson
68. Naval Air Station, Glenview, Illinois
69. Naval Air Station, Glynco, Georgia
75. Naval Air Station, Memphis, Tennessee
78. Naval Air Station, New Orleans, Louisiana
83. Naval Air Station, Olathe, Kansas
147. Naval Avionics Facility, Indianapolis, Indiana
191. Naval Station, New Orleans, Louisiana
192. Naval Ammunition Depot, Shumaker, Camden, Arkansas
193. Naval Air Systems Command Representative, St. Louis, Mo.
194. Naval All-Weather Flight Detachment, Eglin AFB, Florida
* 200. Naval Air Maintenance Training Detachment, Pensacola, Florida

B. SHORE ACTIVITIES OF THE OPERATING FORCES

1. Training Squadron ONE
2. Training Squadron TWO
3. Training Squadron THREE
4. Training Squadron FOUR
5. Training Squadron FIVE
6. Training Squadron SIX
7. Training Squadron SEVEN
8. Training Squadron EIGHT (Helicopter)
9. Training Squadron NINE
10. Training Squadron TEN
11. Visiting Fleet Squadrons (Carrier Qualifications)

Figure 5-1 (Cont'd)

C. OTHER UNITS

1. Florida National Guard Unit (Hq. 265th Bn. AW)
2. USSCG SEBAGO
3. USSCG CAPE YORK
4. Misc. Mil/Civ (Civilian contractor-Air Cargo, transient aircraft, ships)

D. SHIPS AND UNITS HOMEPORTED LOCALLY

* 1. USS LEXINGTON (CVS-16)
* 2. USS TWEEDY (DD-532)

→ Throughput Activity in the CNABATRA Model
* Tenant Activity in the CNABATRA Model

ACTIVITIES RECEIVING SERVICES						A1	A2	A14
Cost Centers/Sub			O →			52	46	0
Cost Centers at			E →			54	53	5
NAS Pensacola			C →			75	43	1
Providing Services			SO →			60	0	0
			SE →			0	0	0
Cost/Sub-Cost		OPNAV 4000	Distribution Rule		Total	Sub Total		
A	1A30	G13	O E C S		7157	146		142	6
	1A40	G12	O E S		3222	270	166	99	5
	9931	J1a	O E S		4376	270	166	99	5
	9939	G13	O E S		4730	270	166	99	5
B	1E20	G11	O		97	46	166	46	0
	1E30	G11	E		539	58		53	5
	1E40	G8	O E S		2170	270	166	99	5
	1J20	G14	O E S		735	270	166	99	5
	6A10	A7	O E C S		10025	6			6
	9921	H3&5	O E S		3145	270	166	99	5
	9932	J1V	O		546	98	52	46	0
	9934	J1Y	E		2837	58	54	53	5
	9937	J*	O E S		4730	270	166	99	5
E	1C20	G3	O E C S		8011	389	241	142	6
	1C40	G3	O E C S		8011	389	241	142	6
	1C50	G4	C		6981	47	75	46	1
	1C70	G4	O E S		3252	270	166	99	5
F	1H30	G7	O E C S		9332	383	241	142	
G	4D10	F4	O E S		2929	270	166	99	5
H	1D20	G9	C		7403	122	75	46	1
	1D30	G9	C		1403	122	75	46	1
	1D40	G9	C		7403	122	75	46	1
	1D50	G9	C		7403	122	75	46	1
	1D60	G9	C		7403	122	75	46	1
N	4C10	F5	O E S		2709	270	166	99	5
N	2142	E4	O E S		4687	270	166	99	5
OH	2330	E3	O E S		7525	284	166	111	7
OF	2141	A4	F L R						
OM	9911	H6	E SE		3285	66		60	6

Figure 5-2. Quantification of Support Provided Tenant Activities by NAS Pensacola (Sheet 1 of 5)

Figure 5-2 (Cont'd) (Sheet 2 of 5

ACTIVITIES RECEIVING SERVICES					A3	A4	A5	A13	A15
Cost Centers/Sub-cost Centers at NAS Pensacola Providing Services			O →		10	120	53	3	6
			E →		29	192	88	25	36
			C →		79	139		4	0
			SO →			66			0
			SE →				45		0
Cost/Subcost		OPNAV 4000	Distribution Rule	Sub Total					
A	1A30	G13	O E C S	32				32	
	1A40	G12	O E S	607		312	225	28	42
	9931	J1a	O E S	295			225	28	42
	9939	G13	O E S	646	39	312	225	28	42
B	1E20	G11	O	3				3	
	1E30	G11	E	25				25	
	1E40	G8	O E S	28				28	
	1J20	G14	O E S	28				28	
	6A10	A7	O E C S	872	118	450	225	37	42
	9921	H3&5	O E S	511	10	312	119	28	42
	9932	J1V	O	227	10	120	88	3	6
	9934	J1Y	E	415	29	192	133	25	36
	9937	J*	O E S	646	39	312	225	28	42
E	1C20	G3	O E C S	32				32	
	1C40	G3	O E C S	32				32	
	1C50	G4	C	217	79	138	0		0
	1C70	G4	O E S	618	39	312	225		42
F	1H30	G7	O E C S	32				32	
G	4D10	F4	O E S	295			225	28	42
H	1D20	G9	C	83	79			4	0
	1D30	G9	C	83	79			4	0
	1D40	G9	C	83	79			4	0
	1D50	G9	C	83	79			4	0
	1D60	G9	C	83	79			4	0
K	4C10	F5	O E S	70				28	42
N	2142	E4	O E S	604	39	312	225	28	
OH	2330	E3	O E S	646	39	312	225	28	42
OF	2141	A4	F L R						
OM	9911	H6	E SE	61				25	36

Figure 5-2 (Cont'd) (Sheet 3 of 5)

ACTIVITIES RECEIVING SERVICES					A16	A17	A22	A24	A25
Cost Centers/Sub-			0 →		11	17	3	0	16
cost Centers at			E →		0	125	8	0	40
NAS Pensacola			C →		854	54	106	30	5228
Providing Services			SO →		0	5	0	0	0
			SE →		0	315	0	0	0
Cost/Subcost ↓		OPNAV 4000 ↓	Distribution Rule ↓	Sub Total ↓					
A	1A30	G13	O E C S	6266	865				5284
	1A40	G12	O E S	540	11	462	11		56
	9931	J1a	O E S	540	11	462	11	0	56
	9939	G13	O E S	540	11	462	11	0	56
B	1E20	G11	O	19			3		16
	1E30	G11	E	48			8		40
	1E40	G8	O E S	67			11		56
	1J20	G14	O E S						
	6A10	A7	O E C S	6812	865	516	117	30	5284
	9921	H3&5	O E S	540	11	462	11		56
	9932	J1V	O	76	11	22	3	0	40
	9934	J1Y	E	488		440	8	0	40
	9937	J*	O E S	540	11	462	11	0	56
E	1C20	G3	O E C S	6812	865	516	117	30	5284
	1C40	G3	O E C S	6812	865	516	117	30	5284
	1C50	G4	C	6272	854	54	106	30	5228
	1C70	G4	O E S	540	11	462	11	0	56
F	1H30	G7	O E C S	6775	865	516	117		5284
G	4D10	F4	O E S	540	11	462	11		56
H	1D20	G9	C	6782	854	54	106		5228
	1D30	G9	C	6782	854	54	106		5228
	1D40	G9	C	6782	854	54	106		5228
	1D50	G9	C	6782	854	54	106		5228
	1D60	G9	C	6782	854	54	106		5228
K	4C10	F5	O E S	540	11	462	11		56
N	2142	E4	O E S	540	11	462	11	0	56
OH	2330	E3	O E S	540	11	462	11		56
OF	2141	A4	F L R						
OM	9911	H6	E SE	488		440	8		40

Figure 5-2 (Cont'd) (Sheet 4 of 5)

ACTIVITIES RECEIVING SERVICES					A26	A27	A28	A29	A30
Cost Centers/Sub				O →	0	1	2	2	3
Cost Centers at				E →	0	0	0	0	16
NAS Pensacola				C →	29	12	27	13	79
Providing Services				SO →	0	0	0	0	0
				SE →	0	0	0	0	0
Cost/Sub-Cost ↓		OPNAV 4000 ↓	Distribution Rule ↓	Sub Total ↓					
A	1A30	G13	O E C S						
	1A40	G12	O E S						
	9931	J1a	O E S	21			2		19
	9939	G13	O E S	24	0	1	2	2	19
B	1E20	G11	O						
	1E30	G11	E						
	1E40	G8	O E S						
	1J20	G14	O E S						
	6A10	A7	O E C S	179	29	13	24	15	98
	9921	H3&5	O E S	19					19
	9932	J1V	O	5			2		3
	9934	J1Y	E	16			0		16
	9937	J*	O E S	24	0	1	2	2	19
E	1C20	G3	O E C S	127	29				98
	1C40	G3	O E C S	127	29				98
	1C50	G4	C	108	29				79
	1C70	G4	O E S	19	0				19
F	1H30	G7	O E C S						
G	4D10	F4	O E S	19					19
H	1D20	G9	C	19					19
	1D30	G9	C	19					19
	1D40	G9	C	19					19
	1D50	G9	C	19					19
	1D60	G9	C	19					19
K	4C10	F5	O E S	24		1	2	2	19
N	2142	E4	O E S	23			2	2	19
OH	2330	E3	O E S	24		1	2	2	19
OF	2141	A4	F L R	0					
OM	9911	H6	E SE	0		0			

Figure 5-2 (Cont'd) (Sheet 5 of 5)

ACTIVITIES RECEIVING SERVICES					A58	A200	D1	D2
Cost Centers/Sub			O →		0	0	79	3
Cost Centers at			E →		0	8	1321	42
NAS Pensacola			C →		9	0	0	0
Providing Services			SO →		0	0	0	0
			SE →		0	52	0	0
Cost/Sub-Cost		OPNAV 4000	Distribution Rule	Sub Total				
A	1A30	G13	O E C S	60		60		
	1A40	G12	O E S	60		60		
	9931	J1a	O E S	1505		60	1400	45
	9939	G13	O E S	1505	0	60	1400	45
B	1E20	G11	O			0		
	1E30	G11	E	60		60		
	1E40	G8	O E S	60		60		
	1J20	G14	O E S	60		60		
	6A10	A7	O E C S	1505		60	1400	45
	9921	H3&5	O E S	60		60		
	9932	J1V	O	82		0	79	3
	9934	J1Y	E	1423		60	1321	42
	9937	J*	O E S	1505	0	60	1400	45
E	1C20	G3	O E C S					
	1C40	G3	O E C S					
	1C50	G4	C			9		0
	1C70	G4	O E S	60		60		
F	1H30	G7	O E C S	60		60		
G	4D10	F4	O E S	60		60		
H	1D20	G9	C	60		60		
	1D30	G9	C	60		60		
	1D40	G9	C	60		60		
	1D50	G9	C	60		60		
	1D60	G9	C	60		60		
K	4C10	F5	O E S	60		60		
N	2142	E4	O E S	1505	0	60	1400	45
OH	2330	E3	O E S	1505	0	60	1400	45
OF	2141	A4	F L R					
OH	9911	H6	E SE	60		60		

ACTIVITIES RECEIVING SERVICES					A6	A7	B4	B6	B10
Cost Centers/Sub-cost Centers at NAS Pensacola Providing Services				0 →	29	29	0	0	0
				E →	348	89	0	0	0
				C →	279	63	0	0	0
				SO →	0	1250	0	0	0
				SE →	0	0	0	0	0
Cost/Subcost ↓		OPNAV 4000 ↓	Distribution Rule ↓	Sub Total ↓					
A	1A30	G13	O E C S	651	651		0	0	0
1	1A40	G12	O E S	1745	377	1368	0	0	0
	9931	J1a	O E S	1745	377	1368	0	0	0
	9939	G13	O E S	1745	377	1368	0	0	0
B	1E20	G11	O	29	29				
	1E30	G11	E	348	348				
	1E40	G8	O E S	1745	377	1368	0	0	0
	1J20	G14	O E S	377	377		0	0	0
	6A10	A7	O E C S	651	651		0	0	0
	9921	H3&5	O E S	1745	377	1368	0	0	0
	9932	J1V	O	58	29	29	0	0	0
	9934	J1Y	E	437	348	89	0	0	0
	9937	J*	O E S	1745	377	1368	0	0	0
E	1C20	G3	O E C S	651	657		0	0	0
	1C40	G3	O E C S	651	657		0	0	0
	1C50	G4	C	337	279	63	0	0	0
	1C70	G4	O E S	1745	377	1368	0	0	0
F	1H30	G7	O E C S	2082	651	1431	0	0	0
G	4D10	F4	O E S	1745	377	1368	0	0	0
H	1D20	G9	C	337	274	63	0	0	0
	1D30	G9	C	337	274	63	0	0	0
	1D40	G9	C	337	274	63	0	0	0
	1D50	G9	C	337	274	63	0	0	0
	1D60	G9	C	337	274	63	0	0	0
K	4C10	F5	O E S	1745	377	1368	0	0	0
N	2142	E4	O E S	1745	377	1368	0	0	0
OH	2330	E3	O E S	4526	1585	1489	762	193	497
OF	2141	A4	F L R		0	0	0	0	0
OM	9911	H6	E SE	2610	1719	107	548	98	138

Figure 5-3. Quantification of Consumption by Throughput Entities in Training Sensitive Activities at NAS Pensacola

Producing Cost Center	Consumption Population From Tenants and Throughputs	Consumption Population From Training Sensitive Activities	Total Consumption Population (except students)	Percentage of Total For Tenants And Throughput Activities
A 1A30	7157	3253	10410	68.75%
1A40	3222	2069	5291	60.90%
9931	4376	2069	6445	67.90%
9939	4730	2069	6799	69.57%
E 1E20	97	313	410	23.66%
1E30	539	1756	2295	23.49%
1E40	2170	3253	5423	66.71%
1J20	735	3253	3988	18.43%
6A10	10025	3253	13278	75.50%
9921	3145	2069	5214	60.32%
9932	546	313	859	63.56%
9934	2837	1756	4593	61.77%
9937	4730	2069	6799	69.57%
E 1C20	8011	3253	11264	71.12%
1C40	8011	3253	11264	71.12%
1C50	6981	1184	8165	85.50%
1C70	3252	3253	6504	50.00%
F 1H30	9332	3253	12585	74.15%
G 4510	2929	2069	4998	58.60%
H 1D20	7403	1184	8587	86.21%
1D30	7403	1184	8587	86.21
1D40	7403	1184	8587	86.21
1D50	7403	1184	8587	86.21
1D60	7403	1184	8587	86.21
K 4C10	2709	3253	5962	45.44%
N 2142	4687	2069	6756	69.38%
OH 2330	7525	2069	9594	78.43%
OF 2141	0	0	0	0.00
OM 9911	3285	1756	5041	65.17%

Figure 5-4. Percentage of Intermediate Products Consumption For Tenants And Throughput Activities at NAS Pensacola

SYSTEM ELEMENT		(GRADUATIONS/TRANSFERS)				MONTHLY AVERAGE	ANNUAL AVERAGE
		Jan 69	Feb 69	Mar 69	Apr 69		
VT4		9	28	114	53	51	612
VT6		33	47	77	49	51.5	618
NASC PILOT	AOCS (OLD)	146	208	198	0		
	AOCS (NEW)	0	0	24	74	163	1956
	F.S. (OLD)	247	223	263	0		
	F.S. (NEW)	0	0	0	319	313	3756
	INDOC-TRINA-TION	77	266	389	182	228	2736
NAS PENSACOLA	VT10	55	58	141	111	91.2	1094
Annual System FPOR							10,316

* AOCS and F.S. programs for VT10 preparation not included.

Figure 5-5. Final Products Input for NAS Pensacola

SYSTEM ELEMENT	(GRADUATIONS/TRANSFERS)				MONTHLY AVERAGE	ANNUAL AVERAGE
	Jan 69	Feb 69	Mar 69	Apr 69		
VT7	49	67	88	108	78	938
VT9	33	50	87	81	62.7	752
Annual System FPOR						1690

Figure 5-6. Final Products Input for NAS Meridian

SECTION 6

PROCESS ANALYSIS

6. Process Analysis

PRODUCT DISTRIBUTION RULES

> Users of the Manpower Allocation Model for CNABATRA must be aware of the intermediate product distribution rules for each air station. Accordingly, the distribution rules are listed by subcost center for the five air stations.

The following pages contain intermediate product distribution rules, listed by subcost center, by the appropriate cost center for NAS Saufley, Whiting, Ellyson, Pensacola (including NAVSCOLCOM), and Meridian. The following abbreviations are used:

O = Officers
E = Enlisted Men
C = Civilians
S = Students

DISTRIBUTION RULES FOR INTERMEDIATE PRODUCTS AT NAS SAUFLEY

(SHEET 1 OF 4)

PMS CODE	SUBCOST CENTER	WORK UNIT (OUTPUT)	INTERMEDIATE PRODUCT DISTRIBUTION
1A	COMMAND/EXECUTIVE OFFICES		
1A10	Command & Executive Offices	Average number of personnel on base	All cost centers * O,E, C,S
1A30	Public Affairs Office	Number of actions	All cost centers * O,E, C,S
1A40	Legal Office	Number of legal cases	All cost centers * O,E, C,S
1A50	Chaplain's Office	Number of military population served	All cost centers * O,E, S
1C	COMPTROLLER		
1C10	Administration	Average number of personnel in C	Internally consumed in 1C
1C30	Budget and Statistics	Number of special budget/statistical reports	1A Command
1C40	Accounting	Number of documents processed	1A Command
1C50	Payroll	Number of civilian personnel on payroll	All cost centers * C
1D	CIVILIAN PERSONNEL		
1D10	Administration	Number of civilian employees on base	All cost centers * C
1D70	Safety	Number of changes in accident rate	1A Command
1E	MILITARY PERSONNEL		
1E20	Officer Personnel Records	Number of officer personnel records	All cost centers * O
1E30	Enlisted Personnel Records	Number of enlisted personnel records	All cost centers * E
1E40	Training	Number of students enrolled	All cost centers * O,E
1E50	Barracks & BOQ	Number of occupants	All cost centers * O,E,S

DISTRIBUTION RULES FOR INTERMEDIATE PRODUCTS AT NAS SAUFLEY

(SHEET 2 OF 4)

RMS CODE	SUBCOST CENTER	WORK UNIT (OUTPUT)	INTERMEDIATE PRODUCT DISTRIBUTION
1F	SPECIAL SERVICES		
1F30	Special Services	Total number of military personnel on active duty within area served by activity	All cost centers % O,E, S
1F40	Nonappropriated Fund Act	Military population served	All cost centers % O,E, S
1J	ADMINISTRATIVE SERVICES		
1J10	Printing and Reproduction	Number of documents processed	Cost Centers 1A,1C,1D, 1E,2H,4A,4D,AA,6J % O, E,C
1J20	Other Office Services	Number of documents processed	Cost Centers 1A,1C,1D, 1E,2H,4A,4D,AA,6J % O, E,C
2A	SUPPLY ADMINISTRATION		
2A10	Supply Officers, Direct Staff	None	Throughput (not in process analysis)
2A20	Administrative Planning	None	Throughput (not in process analysis)
2G	FUEL SERVICES		
2G10	Bulk Distribution	Barrels	6F Air Ops
2G20	Retail Refueling	Gallons (thousands)	6F Air Ops
2H	RETAIL OPERATIONS		
2H10	Servmarts	Line items issued	All cost centers % O,E,C
2H20	Shop Stores	Line items issued	All cost centers % O,E,C
2N	FOOD SERVICES		
2N10	Messes, General	Number of meals served	All cost centers % O,E, S

DISTRIBUTION RULES FOR INTERMEDIATE PRODUCTS AT NAS SAUFLEY

(SHEET 3 OF 4)

RMS CODE	SUBCOST CENTER	WORK UNIT (OUTPUT)	INTERMEDIATE PRODUCT DISTRIBUTION
4A	MEDICAL SERVICES		
4A10	Medical and Surgical Facilities	Number of patients	All cost centers % O,E, S
4D	DENTAL SERVICES		
4D10	Dental Facilities	Number of visits	All cost centers % O,E,S
6A	COMMUNICATIONS		
6A10	Administra. on	Average number of personnel performing communications functions	Internally consumed in 6A
6A40	Telegraph	Number of messages	1A Command
6B	SECURITY		
6B10	Security	Number of personnel in security functions	Throughput (not in process analysis)
6C	AIR OPERATIONS		
6C10	Administration	Number of personnel in 6C	Internally consumed in 6C
6C20	Aircraft Control	Number of take-offs/ landings	6F Air Ops
6C50	Ground Electronics Maintenance	Feet^3 of electronics devices repaired or maintained	Internally consumed in 6C
6C60	Photographic Services	Number of pictures	Squadrons % flying hours
6C70	Ordnance	Number of persons trained and qualified	6B (Security-throughput)
6F	OPERATIONS OF AIRCRAFT		
6F30	A/C Maintenance, Organic	Number of work orders completed	Squadrons % flying hours

DISTRIBUTION RULES FOR INTERMEDIATE PRODUCTS AT NAS SAUFLEY

(SHEET 4 OF 4)

RMS CODE	SUBCOST CENTER	WORK UNIT (OUTPUT)	INTERMEDIATE PRODUCT DISTRIBUTION
AA	AIRCRAFT MAINTENANCE		
AA10	Administration	Average number of personnel in AA	Internally consumed in AA
AA40	Power Plant (Engineers)	Work orders completed	Squadrons % flying hours
AA50	Airframes	Work orders completed	Squadrons % flying hours
AA60	Avionics	Work orders completed	Squadrons % flying hours
AA80	Aviators	Work orders completed	Squadrons % S
6J	TRAINING, GENERAL		
6J30	Training Ops, Academic	Number of students completed	Squadrons % S
SA40	VT1	Number of A-3 aircraft	AA (AMD)
SE40	VT5	Number of A-3 aircraft	AA (AMD)

DISTRIBUTION RULES FOR INTERMEDIATE PRODUCTS AT NAS WHITING
(Sheet 1 of 6)

RMS CODE	SUBCOST CENTER	WORK UNIT (OUTPUT)	INTERMEDIATE PRODUCT DISTRIBUTION
1A	COMMAND		
1A10	Command and Executive Offices	Average number of personnel on base	All cost centers % O, E, C, and S*
1A30	Public Affairs Office	Number of actions completed	All cost centers % O, E, C, and S
1A40	Legal Office	Number of legal cases	All cost centers % O, E, and S
1A50	Chaplain's Office	Number of military population served	All cost centers % O, E, and S
1C	COMPTROLLER		
1C10	Administration	Average number of personnel in 1C	Consumed internally in 1C
1C20	Internal Review	Number of procedural studies comp.	1A Command
1C30	Budget and Statistics	Number of special budget/ statistical reports	1A Command
1C50	Payroll	Number of civilian personnel on payroll	All cost centers % C
1D	CIVILIAN MANPOWER MGT.		
1D10	Administration	Number of civilian employees on base	All cost centers % C
1D20	Employment	Number of personnel actions	All cost centers C
1D40	Employee Relations	Number of civilian employees	All cost centers C
1D50	Employee Services	Number of civilian employees	All cost centers % C

DISTRIBUTION RULES FOR INTERMEDIATE PRODUCTS AT NAS WHITING
(Sheet 2 of 6)

RMS CODE	SUBCOST CENTER	WORK UNIT (OUTPUT)	INTERMEDIATE PRODUCT DISTRIBUTION
1D60	Training	Number of students enrolled	All cost centers % C
1D70	Safety	Number of changes in accident rate	Thruput (not in Process Analysis)
1E	MILITARY PERSONNEL		
1E10	Administration	Number of military personnel on base	All cost centers % O, E, and S
1E20	Officer Personnel Records	Number of officers' records	All cost centers % O,
1E30	Enlisted Personnel Records	Number of enlisted personnel records	All cost centers % E
1E40	Training	Number of students enrolled	All cost centers % E, O
1E50	Barracks and BOQ	Occupants	All cost centers % O, E, and S
1F	RESALE AND SPECIAL SERVICES		
1F30	Special Services	Total number of military personnel on active duty in area served by activity	All cost centers % O, E, and S
1F40	Nonappropriated Fund Activity	Military population served	All cost centers % O, E, and S
1J	ADMINISTRATIVE OFFICE SUPPLIES		
1J10	Printing and Reproduction	Number of documents processed	Cost centers 1A, 1C, 1D, 1E, 2H, 4A, 4D, 6J, AA % O, E, C
1J20	Other Office Services	Number of documents processed	Cost centers 1A, 1C, 1D, 1E, 2H, 4A, 4D, 6J, AA % O, E, C

DISTRIBUTION RULES FOR INTERMEDIATE PRODUCTS AT NAS WHITING
(Sheet 3 of 6)

RMS CODE	SUBCOST CENTER	WORK UNIT (OUTPUT)	INTERMEDIATE PRODUCT DISTRIBUTION
2A	SUPPLY ADMINISTRATION		
2A10	Supply Officers, Direct Staff	None	Thruput (not in Process Analysis)
2A20	Administrative Planning	None	Thruput (not in Process Analysis)
2B	INVENTORY CONTROL		
2B10	Stock Control Requirement	Line items	All cost centers % O, E, S
2B20	Stock Control Requirement	Line items	All cost centers % O, E, C, S
2B30	Receipt Control MGT	Line items	All cost centers % O, E, C, S
2C	PURCHASE		
	Buying Operations	Purchase Action	All cost centers % O, E, C, S
2D	MATERIAL CONTROL		
2D30	Incoming Storage Operations	Measurement tons	All cost centers % O, E, C, S
2D40	Storage and Custody Operations	Measurement tons	All cost centers % O, E, C, S
2G	FUEL OPERATIONS		
2G20	Retail Refueling	Gallons (thousands)	6F Operation of Aircraft
2H	RETAIL OPERATIONS		
2H10	Servmarts	Line items issued	All cost centers % O, E
2H30	Clothing Stores	Volume of sales	All cost centers % O, E, S

DISTRIBUTION RULES FOR INTERMEDIATE PRODUCTS AT NAS WHITING
(Sheet 4 of 6)

RMS CODE	SUBCOST CENTER	WORK UNIT (OUTPUT)	INTERMEDIATE PRODUCT DISTRIBUTION
2M	HOUSEHOLD GOODS		
2M10	Operations	Applications	All cost centers, % O, E, S
2N	FOOD SERVICE		
2N10	Messes, General	Number of meals served	All cost centers % O, E, S
4A	MEDICAL FACILITY		
4A10	Medical and Surgical Facilities	Number of patients	All cost centers % O, E, S
4D	DENTAL FACILITY		
4D10	Dental facilities	Number of visits	All cost centers % O, E, S
6A	COMMUNICATIONS		
6A10	Administration	Average number of personnel performing communications functions	Consumed internally in 6A
6A40	Telegraph	Number of messages	1A Command
6B	SECURITY	Number of people performing security functions	Thruput (not in Process Analysis)
6C	AIR OPERATIONS		
6C10	Administration	Number of personnel in 6C	Consumed internally in 6C
6C20	Aircraft Control	Number of take offs/ landings	6F Operation of Aircraft
6C30	Aircraft Terminal	Pounds of cargo and average weight of passengers	6F Operation of Aircraft

DISTRIBUTION RULES FOR INTERMEDIATE PRODUCTS AT NAS WHITING
(Sheet 5 of 6)

RMS CODE	SUBCOST CENTER	WORK UNIT (OUTPUT)	INTERMEDIATE PRODUCT DISTRIBUTION
6C50	Ground Electronics Maintenance	Feet^3 of electronics devices repaired or maintained	Consumed internally in 6C
6C60	Photographic Services	Number of pictures	Squadrons % flying hours
6C70	Ordnance	Number of personnel trained	6B Security (thruput)
6F	OPERATIONS OF AIRCRAFT		
6F30	A/C Maintenance, Organic	Number of work orders completed	Squadrons % flying hours
6J	TRAINING, GENERAL		
6J10	Training Operations	Number of students completed	Squadrons % S
6J20	Training Operations Flight	Number of students completed	Squadrons % S
6J30	Training Operations Academic	Number of students Completed	Squadrons % S
AA	AIRCRAFT MAINTENANCE DEPARTMENT		
AA10	Administration	Average number of personnel in AA	Consumed internally in AA
AA20	Quality Control	Number of inspections	6F Operation of Aircraft
AA30	Material Control	Number of line items	6F Operation of Aircraft
AA40	Power Plant (Engines)	Work orders completed	6F Operation of Aircraft
AA50	Airframes	Work orders completed	6F Operation of Aircraft
AA60	Avionics	Work orders completed	6F Operation of Aircraft
AA80	Aviators Equipment	Work orders completed	6F Operation of Aircraft

DISTRIBUTION RULES FOR INTERMEDIATE PRODUCTS AT NAS WHITING

(SHEET 6 OF 6)

RMS CODE	SUBCOST CENTER	WORK UNIT (OUTPUT)	INTERMEDIATE PRODUCT DISTRIBUTION
AA90	Support Equipment	Work orders completed	6F Operation of Aircraft
SB30	VT2	Number of students completed	VT3
SB40	VT2	Number of A-3 aircraft	AA Aircraft Maintenance
SC40	VT3	Number of A-3 aircraft	AA Aircraft Maintenance

DISTRIBUTION RULES FOR INTERMEDIATE PRODUCTS AT NAS ELLYSON

(SHEET 1 OF 4)

RMS CODE	SUBCOST CENTER	WORK UNIT (OUTPUT)	INTERMEDIATE PRODUCT DISTRIBUTION
1A	COMMAND/EXECUTIVE OFFICES		
1A10	Command and Executive Offices	Average number of personnel on base	All cost centers % O,E, C,S
1A30	Public Affairs Office	Number of actions completed	All cost centers % O,E, C,S
1A40	Legal Office	Number of legal cases	All cost centers % O,E, S
1A50	Chaplain's Office	Number of military population served	All cost centers % O,E, S
1B	MANAGEMENT ENGINEERING		
1B10	Operations	Number of instructions written	1A Command
1C	COMPTROLLER		
1C10	Administration	Average number of personnel in 1C	Internally consumed in 1C
1C30	Budget and Statistics	Number of special budget/statistical reports	1A Command
1C40	Accounting	Number of documents processed	1A Command
1D	CIVILIAN PERSONNEL		
1D10	Administration	Number of civilian employees on base	All cost centers % C
1D20	Safety	Changes in accident rate	Throughput (not in process analysis)
1E	MILITARY PERSONNEL		
1E20	Officer Personnel Records	Number of officer records	All cost centers % O
1E30	Enlisted Personnel Records	Number of enlisted records	All cost centers % E
1E40	Training	Number of students enrolled	All cost centers % O,E

DISTRIBUTION RULES FOR INTERMEDIATE PRODUCTS AT NAS ALLYSON

(SHEET 2 OF 4)

RMS CODE	SUBCOST CENTER	WORK UNIT (OUTPUT)	INTERMEDIATE PRODUCT DISTRIBUTION
1E50	Barracks & BOQ	Number of occupants	All cost centers % O,E,S
1F	SPECIAL SERVICES		
1F30	Special Services	Total number of military personnel on duty within area served by activity	All cost centers % O,E, S
1F40	Nonappropriated Fund Activities	Military population served	All cost centers % O,E, S
1J	ADMINISTRATIVE SERVICES		
1J10	Printing and Reproduction	Number of documents processed	Cost Centers 1A,1B,1C,1D, 1E,2H,4A,4D,6J,A9 % O,E,S
1J20	Other Office Services	Number of documents processed	Cost Centers 1A,1B,1C,1D, 1E,2H,4A,4D,6J,A9 % O,E,S
2A	ADMINISTRATION		
2A10	Supply Officers Direct Staff	None	Throughput (not process analysis)
2A20	Administrative Planning	None	Throughput (not in process analysis)
26	FUEL OPERATIONS		
2610	Bulk Distribution	Barrels	Training Squadron SH
2620	Retail Fueling	Gallons (thousands)	Training Squadron SH
2H	RETAIL OPERATIONS		
2H10	Servmarts	Line items issued	All cost centers % O,E
2H	FOOD SERVICES		
2H10	Messes, General	Number of meals served	All cost centers % O,E, S

DISTRIBUTION RULES FOR INTERMEDIATE PRODUCTS AT NAS ELLYSON

(SHEET 3 OF 4)

RMS CODE	SUBCOST CENTER	WORK UNIT (OUTPUT)	INTERMEDIATE PRODUCT DISTRIBUTION
4A	MEDICAL SERVICES		
4A10	Medical and Surgical Facilities	Number of patients	All cost centers % O,E, S
4D	DENTAL SERVICES		
4D10	Dental Facilities	Number of visits	All cost centers % O,E, S
6A	COMMUNICATIONS		
6A10	Administration	Average number of personnel performing communications functions	Internally consumed in 6A
6A40	Telegraph	Number of messages	1A Command
6B	SECURITY		
6B	Security	Number of people performing functions	Throughput (not in process analysis)
6C	AIR OPERATIONS		
6C10	Administration	Number of personnel in 6C	Internally consumed in 6C
6C20	Aircraft Control	Number of take-offs/ landings	Training Squadron SH
6C30	Aircraft Terminal	Pounds of cargo and average weight of passengers	Training Squadron SH
6C60	Photographic Services	Number of pictures	Training Squadron SH
6J	TRAINING, GENERAL		
6J20	Training Operations Flight	Number of students completed	Training Squadron SH

DISTRIBUTION RULES FOR INTERMEDIATE PRODUCTS AT NAS ELLYSON

(SHEET 4 OF 4)

RMS CODE	SUBCOST CENTER	WORK UNIT (OUTPUT)	INTERMEDIATE PRODUCT DISTRIBUTION
AA	AIRCRAFT MAINTENANCE		
AA10	Administration	Average number of personnel	Training Squadron SH
SH40	HT8	Number of A-3 status aircraft	AA Aircraft Maintenance

DISTRIBUTION RULES FOR INTERMEDIATE PRODUCTS AT NAS PENSACOLA

(SHEET 1 OF 8)

RMS CODE	SUBCOST CENTER	WORK UNIT (OUTPUT)	INTERMEDIATE PRODUCT DISTRIBUTION
A	COMMAND		
1A10	Command & Executive Offices	Average number of personnel on base	All cost centers by % O, E,C,S
1A20	Reception Center	Number of visitors	Internally consumed in A
1A30	Public Affairs	Number of actions	All cost centers except NAVSCOLCOM by % O,E,C,S
1A40	Legal Office	Number of legal cases	All cost centers by % O, E,S
9931	Chaplains	Number of military population served	All cost centers by % O, E,S
9939	Family Services	Number of military population served	All cost centers by % O, E,S
B	ADMINISTRATION		
1E10	Administration	Average number of personnel in B	Internally consumed in B
1E20	Officer Personnel Records	Number of officer records	All cost centers except NAVSCOLCOM, SD00, SF00, and KB00 by % O
1E30	Enlisted Personnel Records	Number of enlisted records	All cost centers except NAVSCOLCOM, SD00, SF00, and KB00 by % E
1E40	Training	Number of students enrolled	All cost centers by % O, E,S
1J10	Printing and Reproduction	Number of documents processed	Internally consumed in B
1J20	Other Officer Services	Number of documents processed	All cost centers except NAVSCOLCOM by % O,E,S
6A10	Communication Administration	Number of personnel performing communications functions	All cost centers by % O, E,C,S
6A40	Telegraph	Number of messages	Cost Center A
6880	Brig	Occupants	Throughput (not in process analysis)
9921	Barracks & BOQ	Occupants	All cost centers by % O, E,S
9932	Officers Mess	Officer population served	All cost centers by % O
9934	CPO Club	Eligible personnel	All cost centers by % E

DISTRIBUTION RULES FOR INTERMEDIATE PRODUCTS AT NAS PENSACOLA

(SHEET 2 OF 8)

RMS CODE	SUBCOST CENTER	WORK UNITS (OUTPUT)	INTERMEDIATE PRODUCT DISTRIBUTION
9937	Special Services	Number of military personnel on active duty in area served by activity	All cost centers by % O, E,S
9938	Band	Number of functions attended	Throughput (not in process analysis)
C	AIRCRAFT MAINTENANCE		
AA10	Administration	Average number of people in AA	Internally consumed in C
AA20	Quality Control	Number of line items	Internally consumed in C
AA30	Material Control	Number of line items	Internally consumed in C
AA40	Power Plant	Work orders completed	Cost Centers SD00, SF00, and KB00 by % flying hours
AA50	Airframes	Work orders completed	Cost Centers SD00, SF00, and KB00 by % flying hours
AA60	Avionics	Work orders completed	Cost Centers SD00, SF00, and KB00 by % flying hours
AA70	Ammunition Material	Not applicable	Throughput (not in process analysis)
AA80	Aviation Equipment	Work orders completed	Cost Centers SD00, SF00, and KB00 by % flying hours
AA90	Support Equipment	Work orders completed	Cost Centers SD00, SF00, and KB00 by % flying hours
D	AIR OPERATIONS		
6C10	Administration	Number of personnel in D	Internally consumed in D
6C20	Aircraft Control	Number of take-offs/ landings	Cost Centers SD00, SF00, and KB00 by % flying hours
6C30	Aircraft Terminal	Pounds of cargo and weight of passengers	Cost Centers SD00, SF00, and KB00 by % flying hours

DISTRIBUTION RULES FOR INTERMEDIATE PRODUCTS AT NAS PENSACOLA

(SHEET 3 OF 8)

RMS CODE	SUBCOST CENTER	WORK UNITS (OUTPUT)	INTERMEDIATE PRODUCT DISTRIBUTION
6C50	Ground Electronics Maintenance	Cubic feet of electronic devices repaired or maintained	Internally consumed in D
6C60	Photographic Services	Number of pictures	Cost Centers SD00, SF00, and KB00 by % flying hours
6E10	Port Services Administration	Number of personnel performing port services	Throughput (not in process analysis)
6E20	Deep Sea Survival	Number of craft operated	Throughput (not in process analysis)
6F30	Maintenance, Organic	Work orders completed	All cost centers by % aviator
6C40	Crash & Rescue	Not applicable	Throughput (not in process analysis)
E	COMPTROLLER		
1C10	Administration	Average number of personnel in E	Internally consumed in E
1C20	Internal Review	Number of procedural studies completed	All cost centers except NAVSHOLCOM by % O,E,C,S
1C40	Accounting	Number of documents processed	All cost centers except NAVSCOLCOM by % O,E,C,S
1C50	Payroll	Number of civilians on payroll	All cost centers by % C
1C70	Disbursing	Number of transactions	All cost centers by % O, E,S
F	DATA PROCESSING		
1H10	Administration	Average number of personnel in F	Internally consumed in F
1H20	Analysis and Programming	Not applicable	Internally consumed in F
1H30	ADP Operations	Equipment operating hours	All cost centers by % O, E,C,S
1H40	Keypunch Operations	Number of cards (thousands)	Internally consumed in F

DISTRIBUTION RULES FOR INTERMEDIATE PRODUCTS AT NAS PENSACOLA

(SHEET 4 OF 8)

RMS CODE	SUBCOST CENTER	WORK UNITS (OUTPUT)	INTERMEDIATE PRODUCT DISTRIBUTION
G	**DENTAL FACILITY**		
4D10	Dental Facility	Number of visits	All cost centers by % O, E,S
H	**INDUSTRIAL RELATIONS**		
1D10	Administration	Not applicable	Internally consumed in H
1D20	Employment	Number of personnel actions	All cost centers by % C
1D30	Wage and Classification	Number of classifications completed	All cost centers by % C
1D40	Employee Relations	Number of civilian employees	All cost centers by % C
1D50	Employee Services	Number of civilian employees	All cost centers by % C
1D60	Training	Number of students enrolled	All cost centers by % C
1D70	General Safety	Number of changes in accident rate	Throughput (not in process analysis)
J	**MANAGEMENT ASSISTANCE**		
1B10	Management Analysis	Not applicable	Throughput (not in process analysis)
1B20	Engineer	Not applicable	Throughput (not in process analysis)
K	**MEDICAL SERVICES**		
4C10	Medical Facilities	Number of patients	All cost centers by % O, E,S
M	**SECURITY**		
6B10	Administration	Number of people performing security functions	Throughput (not in process analysis)
6B20	Police & Guards	Not applicable	Throughput (not in process analysis)

DISTRIBUTION RULES FOR INTERMEDIATE PRODUCTS AT NAS PENSACOLA

(SHEET 5 OF 8)

RMS CODE	SUBCOST CENTER	WORK UNITS (OUTPUT)	INTERMEDIATE PRODUCT DISTRIBUTION
6B40	Shore Patrol	Not applicable	Throughput (not in process analysis)
6B60	Fire Fighters Structural	Not applicable	Throughput (not in process analysis)
N	SUPPLY		
2110	Supply & Staff	Number of personnel in N	Throughput (not in process analysis)
2720	Contract Execution	Number of line items processed	Throughput (not in process analysis)
2220	Other Stock Control Operations	Number of line items processed	Throughput (not in process analysis)
2142	Customer Service Stores	Line items issued	All cost centers by % O, E,S
2131	Care of Material in Storage	Measurement tons	All cost centers by % O, E,C
2145	Material Screening and Identification	Line items	All cost centers by % O, E,C
2136	Inventory	Line items	All cost centers by % O, E,C
2310	Freight	Measurement tons	Throughput (not in process analysis)
2124	Shipping	Measurement tons	All cost centers by % O, E,C
2121	Packing	Measurement tons	All cost centers by % O, E,C
2210	Requisition Processing	Line items	All cost centers by % O, E,C
OH	SUPPLY - HOUSEHOLD GOODS		
2330	Household Goods	Applications	All cost centers by % O, E,S
OF	SUPPLY - FUEL		
2141	Fuel & Lube Oil	Gallons (thousands)	Cost Centers SD00, SF00, and KB00 by % flying hours

DISTRIBUTION RULES FOR INTERMEDIATE PRODUCTS AT NAS PENSACOLA

(SHEET 6 OF 8)

RMS CODE	SUBCOST CENTER	WORK UNITS (OUTPUT)	INTERMEDIATE PRODUCT DISTRIBUTION
OM	SUPPLY - MESSES		
9911	General Messes	Meals served	All cost centers by % E, S
P	SALVAGE		
3A10	Administration	Line items	Throughput (not in process analysis)
3A20	Receipt & Storage	Measurement tons	Throughput (not in process analysis)
3A30	Scrap Processing	Measurement tons	Throughput (not in process analysis)
3A40	Maintenance Equipment	Not applicable	Throughput (not in process analysis)
3A50	Demilitarization	Measurement tons	Throughput (not in process analysis)
3A60	Reclamation	Line items	Throughput (not in process analysis)
3A70	Disposable Property Sales	Not applicable	Throughput (not in process analysis)
Q	TRAINING, GENERAL		
6J10	Training, General	Number of students graduated	Cost Centers SD00, SF00, and KB00 by % S
6J20	Training, Flight	Number of students graduated	Cost Centers SD00, SF00, and KB00 by % S
9550	Maintenance, Audio-Visual	Work orders completed	Internally consumed in Q
9560	Maintenance, Training Aids	Work orders completed	Internally consumed in Q
9570	Maintenance, Training Aids	Work orders completed	Internally consumed in Q
R	NAVAL AVIATION SCHOOLS COMMAND		
1A00	Command & Executive Staff	Average number of personnel in the command (CUM)	Cost Centers S, T, and U by % Q,E,C

DISTRIBUTION RULES FOR INTERMEDIATE PRODUCTS AT NAS PENSACOLA

(SHEET 7 OF 8)

RMS CODE	SUBCOST CENTER	WORK UNIT (OUTPUT)	INTERMEDIATE PRODUCT DISTRIBUTION
KE30	Personnel Records	Number of enlisted and officer records (CUM)	Cost Centers S, T, and U by % O,E
6J31	Training	No work units reported (CUM	Throughput (not in process analysis)
6J35	Training, A.I.T.	Number of students enrolled	Internally consumed in K
6J37	Midshipmen Indoctrination School	Number of students enrolled	Throughput (not in process analysis)
KK20	Other Office Services	No work units reported	Throughput (not in process analysis)
SD00	VT4 SQUADRON		
SD10	Command & Executive Staff	Average number of personnel in squadron	Internally consumed in SD00
SD20	Administration	Average number of personnel in SD00	Internally consumed in SD00
SD30	Training	Number of students enrolled	Internally consumed in SD00
SD40	A/C Maintenance, Organic	Number of A-3 aircraft assigned	Cost Center C
SF00	VT6 SQUADRON		
SF10	Command & Executive Staff	Number of personnel in the command	Internally consumed in SF00
SF20	Administration	Number of personnel in SF00	Internally consumed in SF00
SF30	Training	Number of students enrolled	Internally consumed in SF00
SF40	A/C Maintenance Organic	Number of A-3 aircraft assigned	Cost Center C
KB00	VT10 SQUADRON		
KA10	Administration	Number of personnel in the command	Internally consumed in KB00
KF10	Operations	Flying hours	Internally consumed in KB00

DISTRIBUTION RULES FOR INTERMEDIATE PRODUCTS AT NAS PENSACOLA

(SHEET 8 OF 8)

RMS CODE	SUBCOST CENTER	WORK UNIT (OUTPUT)	INTERMEDIATE PRODUCT DISTRIBUTION
FF30	Aircraft Maintenance, Organic	Number of work orders completed	Cost Center C
KJ20	Flight Training	Number of students on board	Internally consumed in KB00
KJ30	Flight Training, Academic	Number of students on board	Internally consumed in KB00
S	AVIATION OFFICERS CANDIDATE SCHOOL (AOCS)		
6J32	Training, Pilot	Number of students enrolled (CUM)	Cost Center R
T	FLIGHT SYSTEMS (FS)		
6J34	Training, Flight Systems for Pilots	Number of students enrolled (CUM)	Cost Center R
U	AVIATION OFFICERS INDOCTRINATION		
6J36	Indoctrination	Number of students enrolled (CUM)	Cost Center R
V	SURVIVAL TRAINING		
6J33	Training, Survival	Number of students enrolled	Throughput (not in process analysis)
	SELECTED TENANT ACTIVITIES AT NAS PENSACOLA		
0062	CNATRA Staff		Throughput (not in process analysis)
6200	CNABATRA Staff		Throughput (not in process analysis)
1111	Flight Demonstration Team		Throughput (not in process analysis)
KD00	Aviation Museum		Throughput (not in process analysis)
MAD	Marine Aviation Detachment		Throughput (not in process analysis)

DISTRIBUTION RULES FOR INTERMEDIATE PRODUCTS AT NAS MERIDIAN

(SHEET 1 OF 5)

RMS CODE	SUBCOST CENTER	WORK UNIT (OUTPUT)	INTERMEDIATE PRODUCT DISTRIBUTION
A	COMMAND & STAFF		
1A10	Command & Executive Offices	Average number of personnel on base	All cost centers by % O, E,C,S
1A30	Public Affairs Office	Number of actions completed	All cost centers by % O, E,C,S
1A40	Legal Office	Number of legal cases	All cost centers by % O, E,S
9931	Chaplain's Office	Number of military personnel served	All cost centers by % O, E,S
1C10	Comptrollers Office	Number of studies	Internally consumed in A
1C70	Disbursing	Number of transactions	Internally consumed in A
1D10	Civilian Manpower Management	Number of civilians on base	All cost centers by % C
1D70	Safety	Number of changes in accident rate	Throughput (not in process analysis
B	ADMINISTRATION		
1E20	Officer Personnel Records	Number of officer records	All cost centers except S600 & SJ00 by % O
1E30	Enlisted Personnel Records	Number of enlisted records	All cost centers except S600 & SJ00 by % E
9921	Barracks & BOQ	Occupants	All cost centers by % O, E,S
6A30	Communications, Telegraph	Number of messages	Cost Center A
6A80	Communications, Telephone	Number of official calls	Cost Center A
9937	Special Services	Number of military population served	All cost centers by % O, E,S
1H40	Keypunch Operations	Number of cards (thousands)	All cost centers by % O, E,C,S
1J10	Printing and Reproduction	Number of documents processed	All cost centers by % O, E,C
C	AIRCRAFT MAINTENANCE		
AA10	Administration	Average number of personnel in AA	Internally consumed in AA

DISTRIBUTION RULES FOR INTERMEDIATE PRODUCTS AT NAS MERIDIAN

(SHEET 2 OF 5)

RMS CODE	SUBCOST CENTER	WORK UNIT (OUTPUT)	INTERMEDIATE PRODUCT DISTRIBUTION
AA20	Quality Control	Number of inspections	Internally consumed in AA
AA30	Material Control	Number of line items	Internally consumed in AA
AA40	Power Plants	Work orders completed	Cost Centers S600 and SJ00 by % flying hours
AA50	Airframes	Work orders completed	Cost Centers S600 and SJ00 by % flying hours
AA60	Avionics	Work orders completed	Cost Centers S600 and SJ00 by % flying hours
AA80	Aviators Equipment	Work orders completed	Cost Centers S600 and SJ00 by % flying hours
AA90	Support Equipment	Work orders completed	Cost Centers S600 and SJ00 by % flying hours
D	AIR OPERATIONS		
6C10	Administration	Number of personnel in D	Internally consumed in D
6C20	Aircraft Control	Number of take-offs/ landings	Cost Centers S600 and SJ00 by % flying hours
6C40	Crash & Rescue	Not applicable	Throughput (not in process analysis)
6C50	Ground Electronic Maintenance	Cubic feet of electronic devices	Internally consumed in D
6C60	Photographic Services	Number of pictures	Cost Center S600 and SJ00 by % flying hours
6J20	Flight Support	Flight hours (no RLI)	All cost centers by % AVI
6F30	Maintenance Organic	Work orders completed	Cost Centers S600 and SJ00 by % flying hours
E	DENTAL SERVICES		
4D10	Dental Facility	Number of patients	All cost centers by % O, E,S
F	MEDICAL SERVICES		
4C10	Medical Facility	Number of patients	All cost centers by % O, E,S

DISTRIBUTION RULES FOR INTERMEDIATE PRODUCTS AT NAS MERIDIAN

(SHEET 3 OF 5)

RMS CODE	SUBCOST CENTER	WORK UNIT (OUTPUT)	INTERMEDIATE PRODUCT DISTRIBUTION
G	SUPPLY - GENERAL		
2110	Supply Officers and Staff	Not applicable	Throughput (not in process analysis)
2210	Requisitions	Line items	All cost centers by % O, E,C,S
2220	Stock Control	Line items	All cost centers by % O, E,C,S
2520	Cataloging	Number of identifications	All cost centers by % O, E,C,S
2136	Inventory Control	Line items	Throughput (not in process analysis)
2720	Contract Execution	Actions processed	Throughput (not in process analysis)
2850	Contractor Payment	Invoices processed	Throughput (not in process analysis)
2121	Packing	Measurement tons	Internally consumed in G
2131	Care of Material in Storage	Measurement tons	Internally consumed in G
2132	Rewarehousing	Measurement tons	Internally consumed in G
2124	Shipping	Measurement tons	Internally consumed in G
2122	Bulk Issue	Measurement tons	All cost centers by % O, E,C,S
2123	Bin Issue	Measurement tons	All cost centers by % O, E,C,S
9943	Clothing Stores	Volume of sales	All cost centers by % O, E,S
2142	Servmart	Volume of sales	All cost centers by % O, E,S
HH	SUPPLY - HOUSEHOLD GOODS		
2330	Household Goods	Applications	All cost centers by % O, E,S
HF	SUPPLY - FUEL OPERATIONS		
2141	Retail Refueling	Gallons (thousands)	Cost Centers 5600 and 5700 by % flying hours

DISTRIBUTION RULES FOR INTERMEDIATE PRODUCTS AT NAS MERIDIAN

(SHEET 4 OF 5)

RMS CODE	SUBCOST CENTER	WORK UNIT (OUTPUT)	INTERMEDIATE PRODUCT DISTRIBUTION
HM	SUPPLY - FOOD SERVICES		
9911	Messes, General	Number of meals served	All cost centers by % E
I	SECURITY		
6B10	Administration	Number of personnel performing security functions	Throughput (not in process analysis)
6B20	Police & Guard, Civilian	Not applicable	Throughput (not in process analysis)
6B40	Shore Patrol	Not applicable	Throughput (not in process analysis)
J	TRAINING		
6J10	Training, General	Students graduated	Cost Centers SG00 and SJ00 by % S
6J20	Training, Flight	Students graduated	Cost Centers SG00 and SJ00 by % S
6J30	Training	Students graduated	Cost Centers SG00 and SJ00 by % S
K	PUBLIC WORKS		
9100	Administration		Throughput (not in process analysis)
9110	Public Works Administration		Throughput (not in process analysis)
9120	Engineering		Throughput (not in process analysis)
9130	Family Housing Administration		Throughput (not in process analysis)
9200	Shop Operations		Throughput (not in process analysis)
9400	Vehicle Operations		Throughput (not in process analysis)
9500	Vehicle Maintenance		Throughput (not in process analysis)

DISTRIBUTION RULES FOR INTERMEDIATE PRODUCTS AT NAS MERIDIAN

(SHEET 5 OF 5)

RMS CODE	SUBCOST CENTER	WORK UNIT (OUTPUT)	INTERMEDIATE PRODUCT DISTRIBUTION
7600	Utility Plants		Throughput (not in process analysis
7830	Maintenance Shops		Throughput (not in process analysis)
8200	Electricity		Throughput (not in process analysis)
SG00	VT7 SQUADRON		
SG10	Command & Staff	Average number of personnel in SG00	Internally consumed in SG00
SG20	Administration	Number of personnel supported	Internally consumed in SG00
SG30	Training	Number of students aboard in SG00	Internally consumed in SG00
SG40	A/C Maintenance Organic	A-3 status aircraft assigned	Cost Center C
SJ00	VT9 SQUADRON		
SJ10	Command & Staff	Average number of	Internally consumed in SJ00
SJ20	Administration	Number of personnel supported	Internally consumed in SJ00
SJ30	Training	Number of students aboard in SJ00	Internally consumed in SJ00
SJ40	A/C Maintenance	A-3 status aircraft assigned	Cost Center C

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13. ABSTRACT

A Manpower Allocation Model (MAM) and a Productivity Measurement Model (PMM) for the Naval Air Basic Training Command (CNABATRA) were developed to provide Navy management with tools for improved manpower planning, programming, and budgeting. Development of the models included an investigation of the available data and an analysis of the processes which take place at various CNABATRA facilities. After the models were formulated, computer programs were written, tested and run using the available data. The MAM provides a quantitative means of examining manpower requirements to support a range of pilot training rates in increments selected by the user at the five naval air training stations and ten training squadrons comprising CNABATRA, its command headquarters staff, as well as the Naval Air Training Command Headquarters staff and the Naval Aviation Museum. The model is designed to use data from RMSPRIME, OPNAV 5320, Enlisted Distribution and Verification Reports (BUPERS Report 1080-14), and Student Training Progress Critiques. Other sources of data can also be utilized.

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Personnel Research						
Manpower Allocation Model - MAM						
Productivity Measurement Model - PMM						
Pilot Training Rate - PTR						
Resource Management System - RMS						
Process Analysis						